

The
Home Garden Handbooks

ROCKWELL

LAWNS





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The
Home Garden Handbooks

LAWNS

BOOKS BY
F. F. ROCKWELL

AROUND THE YEAR IN THE GARDEN
THE BOOK OF BULBS
THE HOME GARDEN HANDBOOKS

IRISES

LAWNS

SHRUBS

DAHLIAS

GLADIOLUS

ROCK GARDENS

EVERGREENS FOR THE SMALL PLACE

The Home Garden Handbooks

L A W N S

BY

F. F. ROCKWELL

AUTHOR OF "AROUND THE YEAR IN THE GARDEN," "THE BOOK
OF BULBS," "ROCK GARDENS," ETC.

Photographs by THE AUTHOR

And Drawings by THE AUTHOR *and* GEORGE L. HOLLROCK

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SET UP BY BROWN BROTHERS LINOTYPERS
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DEDICATED
TO
DR. L. C. CORBETT

Senior Horticulturist, United States Department of Agriculture, Bureau of Plant Industry, who, in his many years of service has contributed so largely to the increasing beauty of American homes.

HOW TO USE THIS BOOK

THIS is one of the Home Garden Handbooks. Like its companion volumes in the series, it is planned to give, as briefly as possible, the information you need in order to succeed with one important gardening task. Here the subject is the planning, making, and maintenance of the lawn.

But few photographs are used in this book. There are two reasons for this: first, the author feels that most of the points which really need illustrating can be explained more clearly by drawings than by photographs; secondly, the use of few photographs makes it possible for you to get the information presented at the lowest possible price.

THIS BOOK IS DESIGNED TO SERVE PRIMARILY AS A SUPPLEMENT TO YOUR SEED CATALOGUES. They offer the grasses and grass mixtures suggested, and show illustrations of most of the special lawn tools. Read the opening chapters of this book, with their suggestions on how to plan your lawn, before you order your lawn materials; and the succeeding chapters, on how to make and care for your lawn, before you set to work.

Greatest care has been taken to make the index as complete as possible so that the reader may find immediately all the information which is given on any particular point, even though it may be referred to in several places in the book. Get the habit of consulting your Home Garden Handbooks while you are doing the work!

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LAWNS

INTRODUCTION

BY CHESLA C. SHERLOCK

Associate Editor, Ladies' Home Journal

MOST of our troubles with our lawns have been due to the fact that we have allowed them to grow "by main strength and awkwardness." All sorts of intelligent care and attention will be devoted to the garden, and the culture of the things we attempt to grow there, but the lawn—well, lawns always *have* struggled through without much thought!

It is from some sort of thinking like this that we have borrowed that pessimistic saying from the Old World: "It takes a hundred years to make a real lawn!" It probably does, if Nature is to be forced to do the job unaided, especially in the basement excavation soil and rubbish so many of us attempt to establish lawns upon.

There should be no mighty mystery about real lawn-making. The same attention to soil preparation, selection of seed, plant foods, and seasonal care that goes into the garden proper will yield rich returns in the lawn. And we must have good lawns, if we would have good gardens!

There can be no pride in our gardens unless there is pride in our lawns. The lawn is the "feet" of the garden—the foundation and background which gives it its real valuation. For if the lawn is poorly made, or unkept, it will destroy the results of all of our efforts to attain perfection in the garden proper.

However, one does not have to be a garden enthusiast to be interested in this question. The lawn is present as a challenge

and problem wherever there is a home, irrespective of whether gardening is undertaken or not. The lawn must, therefore, interest most of us—and it should come first, because it is the first essential pigment to use in creating the setting for that jewel, the home.

This little volume points the way to new lawn successes and pleasures simply, concisely, clearly. And as you go about making your lawn, under its intelligent guidance, you will find that there is a real pleasure in the work.

I have always gotten more pleasure in my lawns than in any other portion of my garden work. I shall never cease to thrill at a real strip of greensward. A lawn that is like velvet, that has no weeds, that grows evenly all season, that lies smooth and supple is "a joy forever." I do not begrudge the care that has gone into it; for those hours were really the happiest of all that the outdoors has given me.

Look at your lawn from this viewpoint; solve its problems through the suggestions in this volume; make it a matter of pride, a striving for perfection, and the real riches of Nature's best hours will truly be yours.

CHAPTER I

THE PERPETUAL BEAUTY OF A PERMANENT LAWN

TAKE your own home town, for example.

Drive, or better still, walk—it will be an interesting experience to leave the car in the shed, just for once—through the best residence section.

What is the first thing about the most attractive-looking places you see to arrest your attention? Expensive evergreens—extensive shrubbery plantings—fine shade trees—flower beds?

Not at all! The most beautiful properties may have none or all of these things. The one thing they do have in common, which, large or small, humble or pretentious, they *must* have in order to impress themselves favorably upon the observer, is a well-kept, smooth, green lawn. Without this, no matter how elaborate the rest of the landscape planting may be, they fail to register as arresting, attractive places. A good lawn is just as essential to the pleasing appearance of the home surroundings as a good complexion is to the beauty of a woman. Let either lawn or complexion be rough, uneven, spotty, and no passerby is going to pause for a second look; nor will any amount of adornment in other ways make up for lack in this. A good lawn is the one absolutely indispensable feature among the many which may contribute toward making the home surroundings as pleasing in appearance as every home owner wishes to have them.

Just why a smooth, unbroken velvety bit of greensward possesses the universal appeal which it undeniably does it would be difficult to say. A perfect surface of any sort—for instance,

that of an unruffled pool—has a certain charm for most of us. The eye travels with no conscious effort to its margins, and there results a mental reaction of peacefulness and tranquillity such as nothing else in small area planting can give. The color, too, is pleasing, and undoubtedly contributes much to this effect. A good lawn is a green gem of perpetual beauty which age cannot wither nor custom stale.

IT SERVES A DUAL PURPOSE

But not only for itself alone is a fine lawn invaluable for the home landscape; it enhances the beauty of all the other parts of the landscape planting. A perfect lawn “sets off” a bed or border of flowers as a piece of green velvet does a gleaming gem; its smooth surface stretches to the irregular line of the shrubbery planting, as that of a pool spreads to its edges, carrying the eye to objects of interest and beauty beyond. Even such intrinsically ugly things as utilitarian walks and driveways become passably attractive if they cut through a verdant carpet which so compels the admiration of the beholder that their own unsightliness is subordinated in the general view. And everyone is familiar with the enchanting effect of a vista of smooth lawn combined with beautiful trees, such as the one pictured in the frontispiece of this book.

If, then, a good lawn is so desirable, so indispensable in fact, for the creation of a really pleasing landscape about the home, why is one so seldom to be found? Certainly not because of any lack of appreciation. Even by the least garden-minded home owner, a good lawn is recognized as essential.

The first cause of the universal existence of second-rate lawns is ignorance. While almost every home has a lawn, or at least a grass plot of some sort, there is no phase of garden making about which less genuine practical information, or more handed-down and passed-around misinformation, is current. Many useless, and some positively injurious, lawn-making practices have been transmitted from one amateur gardener to another; and not infrequently professional gardeners and garden writers

have abetted in their dissemination. For generations they have been accepted at face value, without anyone ever taking the trouble to really check them up. It is remarkable that, despite the universal interest in lawns, no new book on the subject of lawn-making in America has been published in more than twenty years. American lawn-making was originally based largely upon English tradition, which in lawn-making, as in so many other kinds of gardening, we have had to *unlearn* before developing practices better adapted to American conditions.

Among some of the practices and beliefs commonly followed and accepted, which are undesirable or positively injurious, are the following:

Giving an annual application of lime. Except under unusual circumstances, it is better never to do this.

Top dressing or mulching the lawn with manure in winter or early spring.

Deep preparation of the soil before planting a lawn. Not infrequently half the work done in lawn preparation is absolutely wasted.

Planting in the spring. Probably ninety-five per cent of all new lawns are planted in the spring, although fall planting is decidedly better for several very definite reasons.

The assumption that when a lawn fails the cause has been "poor seed"; the chances are ten to one that it would have failed anyway, no matter how good the seed.

The belief that weeds are the cause of a poor lawn. The fact is that almost always it is the poor lawn which causes the weeds.

The "sweat-of-thy-brow" theory that the only way to get rid of such pestiferous lawn weeds as dandelions and plantains is to dig them out. Frequently there are ways to eliminate them not only much less arduous, but much more effective.

I am not urging the reader to take any of these statements, widely at variance as they are with the methods still most commonly practised, without investigating the facts offered in support of them. All that I do ask is that he subjects to equal

"I'm-from-Missouri" scrutiny, the things about lawn-making and care which he has all along been taking for granted, merely because he has heard or read them somewhere.

New "theories" of lawn-making have been introduced from time to time, each of which was supposed to be the long-looked-for solution of all lawn-making problems. While these have brought us valuable new information, they have failed to accomplish the revolution in lawn-making which their sponsors anticipated. The trouble with such systems is that they place entirely too much emphasis upon one or two factors in the making of a lawn, in proportion to other things which must be considered. I have been making lawns for nearly thirty years and have not yet found any trick method which could be counted upon as a short-cut to success. During the last few years I have worked out a method of lawn-making which is, in some respects, different from any I have seen used or advocated elsewhere, and which with me has given exceptionally satisfactory results. This method is described fully in Chapter IV. Whatever merit it may possess, or claim to originality may be made for it, is based upon no startling discovery concerning fertilizers or grass seed formulas, but merely upon experience, observation, and commonsense. One of my friends has facetiously dubbed this the "chocolate-cake method of lawn-making." That, perhaps, describes it graphically enough.

A GOOD LAWN POSSIBLE UNDER ALMOST ANY CONDITIONS

I do not want to close this introductory chapter without a word on one more "superstition" about lawn-making.

Many property owners, after two or three unsuccessful attempts to establish a lawn, come to the conclusion, possibly with the help of some gardening neighbor, that they just never can hope to have a good lawn because "conditions are not favorable."

A lawn may be established anywhere where there is enough light for grass to grow. All other conditions may be overcome or altered if the lawn-maker is willing to take the trouble.

Sometimes the cost involved may make a lawn not worth while—though this is seldom true in any place where one would be likely to think of trying to establish a lawn. Often it is more practical and quite as satisfactory to use some kind of a ground covering other than grass. Several plants available might often well be used. But whether one's soil be sweet, acid, or even "sour"; whether it be quite closely shaded, or fully exposed to wind and sun; whether it be so poorly drained as to stay wet most of the year, or so over-thoroughly drained as to be always dry, one may, by using methods and grass varieties which are adapted to meet the situation, obtain a lawn which will be satisfactory, if not ideal.

Just because you may have failed two or three times, or oftener, trying to get a lawn—perhaps using a different brand of seed each time to change your luck!—do not feel that you are bound to go lawnless the rest of your days. See, in reading the following pages, if you cannot find some probable cause for your past failures—the author has had plenty of them in gaining such information as he now has!—and some encouragement for trying at least once more.

CHAPTER II

THE LAWN IN THE LANDSCAPE PICTURE

Too often the lawn is thought of as a separate entity—a thing apart from the other features of the landscape planting and associated with them only indirectly.

This is a mistake. From the very first conception of the planting of the place the lawn should be considered as an integral part of the plan; and some sort of a plan there must be, no matter how small the area, nor how severely simple the planting scheme.

In a word, before one undertakes the construction—or reconstruction—of the lawn, it is desirable to make for oneself a mental picture, as definite as possible, of the place as a whole as it will appear when planted. There is no necessity of attempting to think out the details of flower gardens, shrub plantings, and so forth—in fact, at this stage of the game, to do so will result only in confusion. But there should be a fairly definite idea of the proportion of the total space to be devoted to the lawn or lawns; the major sections or “areas” into which the grounds are to be divided; and where walks, drives, hedges, and the other more important plantings are to go. Such a picture of the place, as it will ultimately appear, is certain to give more satisfactory results than the usual method of merely planting everything to lawn first, and later taking parts of it for other purposes. The latter method is wasteful of time, labor and material, and gives inferior results.

In the limited space of a small volume it is not possible to dip very deeply into the fascinating art of landscape design. This brief chapter presents some of the more important points



The Lawn in the
Landscape Picture



"The more the lawn is cut up by walks, flower beds or hedges, the smaller the area will appear."

to consider in planning the lawn—and in making a definite plan before the actual construction is undertaken.

THE PART OF THE LAWN IN THE LANDSCAPE PLAN

The lawn may be considered as playing three quite distinct rôles in the creation of the landscape picture. When one is planning a lawn as an important part of the general landscape scheme, its triple function should always be kept in mind. The test of whether or not a lawn is well planned is the extent to which it fulfills one or more of these three purposes. Often two, sometimes all three of them, are combined. We can get a clearer understanding of each, however, by considering them separately.

Any landscape planting, whether it be on a fifty-foot lot or an estate of fifty acres, should be the creating of a beautiful picture. The composition of any picture must include foreground and background, with usually some central dominating subject or point of focus. In the landscape picture, the lawn may become, for the several different sections of the planting, in turn foreground, background, and frame.

As Foreground. The most usual purpose of the lawn in landscaping is as foreground. As one views a place, this may be but a few square rods of greensward between the sidewalk and the house or foundation planting about its base; or it may be an imposing sweep of acres, stretching back from the street, or from the approaching drive, to a mansion on an elevation. In either case the eye should be led over a surface which in itself is pleasant to look upon, back to the focus point of the picture.

Again, as one looks out from porch or terrace, from living-room or sun-room windows, the lawn becomes a foreground for the perennial border, the shrubbery border, or a gate or an arch in a hedge, leading to some other area of the grounds.

As Background. For beds or borders along paths or drives, or in other locations where they are viewed from close by, the lawn becomes in turn a background. It serves the same purpose

for individual or "specimen" flowering shrubs or trees; for small groups of shrubs or evergreens; and for various other types of planting. Most plant forms, and the majority of flowers, especially those of light shades, are most effective when seen against a suitable background. Around the borders of the place, hedges, shrubs and evergreens are utilized for this purpose. For plantings made at some distance in from the boundary line, the lawn may often be made to serve as a background.

As a Frame. Where the mass of the planting is confined mostly to the margins of the property, with the central area left open and comparatively unplanted—and this is the type, on the whole, best adapted to both small and moderate sized places—the lawn serves as a frame for the residence and its base plantings; or, if we call the border planting of trees and shrubs the frame, the lawn may be conceived of as the "mat." Individual flower beds and design beds, formerly so much the vogue, have gradually disappeared from our modern gardening, although there are occasions when the former may be used to advantage. For these, and for such formal types of gardening as the rose garden, or a flower garden made up of small individual beds, the lawn, of course, serves as a frame. The beauty of such gardens depends very greatly upon the quality of the turf surrounding and between the beds.

THE LAWN AS A FACTOR IN CREATING THE ILLUSION OF SPACE

With the increasing value of real estate, and the correlated decrease in the size of country and suburban properties for building, it becomes more and more important in the landscaping of home grounds to achieve as great an effect of spaciousness as may be possible under the circumstances.

No part of the planting can contribute more directly to this end than a smooth and unbroken expanse of lawn, with marginal plantings so arranged that no sharp and definite boundary lines are revealed.

The more the lawn area is cut up by walks, flower beds, or

*Several Methods of
GRADING NARROW LAWNS
15 to 40 Feet from
Sidewalk to Dwelling*



Terraced near the house, with slight grade to street.



Terraced near the street.



Even grade from street to house.



Slightly rounded grade from street to house—the most satisfactory for average conditions.

*Several Methods of
GRADING WIDER LAWNS
40 to 50 Feet from
Street to Dwelling*



Terraced lawn—best associated with more or less formal architecture and landscaping.



Gently sloping grade near house, running down to level area at street—best for average conditions.



Embankments with dry rock walls and rock plants, suited to uneven grounds and naturalistic or picturesque type of landscaping.

low hedges which do not conceal what lies beyond, the smaller the area will appear. On the contrary, the less the lawn surface is broken up, and the more its margins are concealed with plantings in irregular curves—which suggest much greater depths than they actually possess and reveal here and there half-glimpses of more beyond—the greater the apparent size of the property. It is quite possible, by planting alone, to make one of two small plots of equal size look to the casual observer quite twice the size of the other.

The reason for this illusion of greater space is no mystery. A smooth, uninterrupted stretch, such as good greensward, gives the eye no ready-to-use means of estimating distance; the vision of the beholder, finding nothing near at hand to arrest it, is unconsciously focused upon a distant point. If, however, the surface is broken up with paths, flower beds, small shrubs or evergreens, each of these becomes a stopping place for the vision, and serves as the basis of an unconscious mental calculation of distance.

CONTOURS—LEVELS, SLOPES, AND TERRACES

Another important consideration in planning how the lawn is to be made is the possibility of using slopes and terraces, rather than keeping the lawn perfectly level.

Unless the area for the lawn is extremely small, it is usually possible to give an appearance of naturalness and increase the beauty of both lawn and landscape planting by incorporating at least a slight slope. The exact contour will be determined largely, but by no means wholly, by the natural “lay” of the land.

Level grades should be used where the attempt to introduce slopes will look too artificial, and also in formal gardening, where the general treatment should be architectural in style, employing straight lines and regular angles and curves.

The terrace also is decidedly formal, and is really appropriately used only where the landscaping is more or less formal in character. Terraces are often seen where they are entirely

out of keeping with the rest of the planting. The terraced lawn is difficult to construct and difficult to keep in condition. Where the grading of the place necessitates changes from one level to another so abruptly that a natural slope is not possible, a dry wall may often be more desirable than a terrace. This will require much less care, from season to season, and may be made to fit perfectly into a naturalistic type of landscaping (see page 13).

A slope so graded as to appear natural is the happiest solution in most lawn-planning problems. It should be the first of the three alternatives to choose, and discarded only when there is some good reason for employing either a level or a terrace in its stead.

When these various considerations have been carefully gone over, and their bearing upon the conditions which confront the prospective lawn-maker taken into account, it will be possible to plan the lawn intelligently and with definite purpose, instead of merely going ahead blindly and "making a lawn."

CHAPTER III

THE ESSENTIALS OF A SATISFACTORY LAWN

IF we are perfectly frank, it must be admitted that the majority of lawns are *not* satisfactory. Comparatively few are even passable. How many home owners do you know who are fully satisfied with the lawns which they have succeeded in making, even after several attempts?

What *is* a satisfactory lawn? That is logically the first question to be answered in an attempt to build one.

FORM AND TEXTURE

The lawn, to be really satisfactory, must be satisfying in two ways which are quite distinct from one another.

First, it should fit pleasingly into the general landscape, as has been pointed out in the preceding chapter. If it does this, it may be said to be satisfactory in form—in size and shape.

The other respect in which it should be satisfactory is in texture. We speak easily of a “smooth, green, velvety lawn”—such a lawn as is described as sure to result from the use of this or that special formula in the seed catalogue, and is sometimes pictured in color to revive our almost abandoned hope of possessing such a lawn for our own. A genuinely smooth, green, and velvety lawn, however, is a rarity; and incidentally, not to be achieved merely by the use of any mysterious secret grass-seed formula so far evolved upon this mundane sphere.

Form—the Laying Out of the Lawn. If a plan of the planting to be done on the place has been made, the lawn areas will, of course, be indicated thereon. It is of great advantage to make such a plan, even though it may be the roughest sort of a sketch. As nothing else can, it helps to crystallize one’s ideas about the arrangement of the planting.



Making a lawn: top soil brought to grade, paths and flower beds marked out.



Making a lawn: preparing the compost for top layer—loam, peatmoss, and fertilizers mixed together.

The next step is to lay out upon the ground itself the driveway, walks, and lawn area or areas. This is best done first in a preliminary way, with one's mind open to changes which may suggest themselves as it becomes possible to visualize more definitely what the actual plantings will be like. For this work a number of small stakes—readily made by cutting in two and sharpening ordinary plastering lath—will be found convenient. With them, one may quickly outline the locations of the proposed drives, walks, and paths, flower and shrubbery borders, hedges, and even the more important large trees, or evergreen groups. These markers may be changed quickly and easily until a satisfactorily pleasing effect is obtained. One may thus get a very definite picture of the *form* which the future lawn is to assume.

In passing; a word may be said concerning driveways and walks, as it is necessary to determine exactly where these are to go, and usually better that they should be constructed, before work on the lawn is begun.

In very small areas, it may be necessary to have the driveway into the garage, and the main walk to the house from the street, direct, straight lines. If the landscaping is to be formal or semi-formal in character, straight lines may be desirable. But ordinarily, where possible, a curve, even though it may be but a slight one, is more graceful in appearance and more gracious in its appeal. A curved walk or drive, entering the grounds near one of the side boundaries, often gives the largest possible unbroken plot of grass between street and residence. A curve so planted that what lies beyond is half concealed is an effective means of increasing the apparent distance to any point.

Unless the general scheme of planting is more or less formal, any curve used should be easy, natural and irregular, rather than composed of mathematical arcs. While the curve in a walk or drive may be entirely artificial, an *apparent* reason for its existence may be supplied later in the planting, with suitably placed trees, shrubs, or groups of plants.

Curves are easily laid out with a piece of stiff rope, or garden hose laid on the ground and altered in position until the desired line is obtained. For longer distances, one may take a bundle of stakes, and, walking along the approximate line to be followed, place one every ten feet or so. Then, standing at one end of the line, have an assistant shift the stakes to the right or the left, as necessary, until they "line up." The edges of the path or drive may then be marked permanently with flexible wooden strips held in place by stakes (see page 49, also photograph facing page 16). The same methods may be used in outlining shrubbery and flower borders.

Contours. The form of the lawn includes, of course, elevations or grades as well as size and shape. These may be indicated in laying out the lawn, by using stakes of varying heights. For preliminary purposes these may be placed by eye, being checked up later when the grades for the actual work are established (see page 29). If terraces or walls are to be used, these may be indicated in the same way.

Texture—Turf Versus "Grass." Many lawns which have been carefully planned and executed as to form still remain unsatisfactory because of poor texture. They have pleasing features but poor complexions!

Unfortunately, the texture of the lawn cannot be tried out in advance, as its form may be. But it takes no expert to see that there is a vast difference between a smooth, even closely knit turf, covering the soil uniformly like a carpet, and an ordinary "grass plot" which, while it may look green from a distance, is in reality not turf at all, but a colony of clumps or clusters of various grasses, with decidedly bare spaces between. The texture of the lawn is assumed too often to depend wholly upon the grass seed used. This is extremely important; but the best grass seed in the world will not produce good turf upon an improperly prepared soil foundation. The surprising fact—and one which so many home owners seem never to realize—is that less trouble and expense are necessary to have really good turf than a mere plot of grass. The first season's investment

in the former may be more, but over several years the cost of the turf will be decidedly less.

LAWNS FOR VARIOUS CONDITIONS

The first step toward predetermining what the texture of the lawn is to be, before actual construction is begun, is to make as careful a study as possible of local soil conditions. It is very easy to take a spade or an earth augur and determine the character of the soil to a depth of twelve to fifteen inches. It is also simple to ascertain whether it is naturally acid or alkaline (sweet) soil. A "soiltex" outfit, which costs a dollar, may be used to determine the acidity of the soil; or a sample may be sent for testing to one's State Experiment Station.

Other things to consider are location—whether in full sun, partial shade, or all-day shade; whether the turf will be exposed to more than ordinary wear; or whether it must be grown upon a steep terrace or bank, or under some other unusual condition.

And finally, there is the climate. Grasses that will thrive in some sections will not live in others. (See page 41.)

The success of your lawn will depend very directly upon how carefully it is planned to meet your conditions. Seed mixtures for various soils and locations are suggested in Chapter XI.

CHAPTER IV

BUILDING AND FOUNDATION

THIS is the most important chapter in this book. It should be read carefully, twice through. It is the most important first, because it deals with the preparation for planting, which is nine-tenths of the work of making a good lawn; and secondly, because many of the suggestions in it differ radically from those usually recommended and practised. Feeling a certain sense of responsibility in advocating a more or less new method of lawn-making, I do not wish any reader to follow it without understanding the whys and wherefors, as well as the hows.

THE CHARACTER OF TURF

For a long time I have been convinced that the methods usually advised for preparing the soil for lawns are based upon tradition rather than upon existing facts. Moreover, there has been a similarity about the directions given in most lawn literature which suggests their transmission from one writer to another, rather than being founded upon any original investigation of the subject.

How Lawn Grasses Grow. Before considering the proper culture for any sort of plant, it is but logical to study the growth-habits of the plant. Such investigations of lawn grasses appear to have been sadly neglected. One may search in vain in lawn literature, and even in most Government reports and bulletins, for information on the subject.

One need not be a scientist, however, to make a few experiments. Start, for instance, by taking up a sod of turf, of convenient size, say six inches square and four inches deep. Begin

shaving off the bottom, a little at a time, and notice how many roots are to be found—or *not* found—in the lower inch. It is not until one gets within three inches of the surface of the soil that grass-roots are to be discovered in any abundance. By far the greater mass of them, probably over ninety percent, occupy the *top two inches* of soil (see illustration on page 22). Below four inches, the roots are few, or non-existent. If, when the turf has been pared down to a thickness of about two inches, one removes all the soil which it is possible to dislodge by repeated sousings in a pail of water, it will be apparent how thickly the grass roots are crowded into the top two inches.

A further investigation of the composition of turf roots, made by dissecting out individual plants, will quickly demonstrate that the new feeding roots are *not* formed along branching tips of the old roots, extending deeper and deeper down into the soil—as is the case with most perennials and annuals—but that new roots start from the crowns of the plants near the surface. Furthermore, the tendency of root growth is lateral or spreading, just under the surface of the soil, instead of extending down into it. (In the sample of turf illustrated on page 22, one root over eight inches long was taken from a turf less than two inches thick.

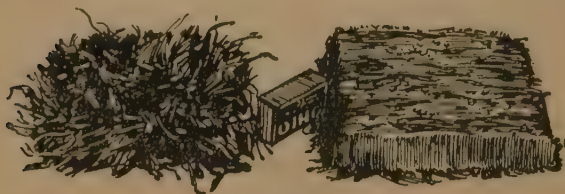
If young grass plants, a few weeks old, are dug up and examined, there will be plainly discernible the fact that the roots develop in a group or cluster at the base of the tiny plant, instead of forming deeply penetrating branching main roots. Their greedy affinity for any tiny particles of humus, or decaying vegetable matter, within reach, will also be marked: the latter fact, indeed, will have been noticed by anyone who has ever used manure in the vegetable or flower garden—the roots of any lawn or weed grasses, or of clover, starting in or near a lump of manure, take immediate possession of it and form a mass of fibrous rootlets, *if it is near the surface*. But any number of lumps of manure may be turned up from a few inches below the surface, without any evidence of a single grass root ever having found its way down to one of them.

A Study of Grasses

(From photos by the Author)



Section of turf more than five years old, shaved down to two inches in thickness; roots just beginning to show numerously.



Piece of same turf with all soil washed out. At left, showing mass of *spreading* roots.



Individual plants—some over eight inches long—dissected out from mat of turf two inches thick. Upper right—Plants of white clover, showing creeping habit.

A Study of Grasses

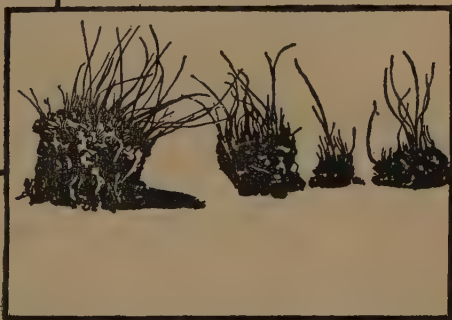
(From photos by the Author)

GRASS PLANTS THREE WEEKS OLD
FROM SEED.

At left, individual plant, showing
how close to surface first feeding
roots are formed.



At right, sections of
turf. Roots have al-
ready formed solid mat
in compost top-dress-
ing.



Individual plants, showing affinity of tiny feeding rootlets for
moist humus particles.

The lawn grass plants are surface feeders, both when they start and throughout their existence; and grass roots possess an unusual affinity for humus.

THE SOIL FOUNDATION FOR TURF GROWTH

What, then, is the logical preparation of the soil for the growth of lawn grasses?

Evidently it will not be "the same as for a good crop of corn or potatoes," as has been so often advised. Nor does it seem reasonable to state that "a depth of one foot (of the richest soil possible) is absolutely necessary, but two feet is immeasurably better." As a matter of fact, excellent turf may be grown upon three or four inches of soil. A series of the finest lawns I have ever examined—the famous terraces of the beautiful little town of Outremont, which lies at the base of Mount Royal, in the city of Montreal—have been maintained for decades on but two to four inches of soil over a rock ledge which slopes at an angle of nearly forty-five degrees! What country boy has not, at some time, stripped pieces of vigorous sod from a rock or ledge but an inch or two beneath the surface?

The only conditions essential for the healthy growth of the usual lawn grasses are:

1. Drainage sufficient to carry off surplus surface water so that it will not stand in the soil higher than four or five inches below the surface.
2. Two to four inches of surface soil containing sufficient plant food and humus to maintain the grass plants in vigorous growth.
3. Water in sufficient quantity, supplied constantly enough, to keep the plant foods dissolved and available for root use, and to meet the demands made by continuous evaporation through the foliage.

Our problem, then, becomes one of providing a soil foundation for the lawn which will meet these several conditions.

If we picture the soil, for the sake of illustration, as a layer cake, the bottom layer is the sub-soil, which must be sufficiently

open and porous to provide good drainage. The next layer above this, consisting of loam or top-soil, and varying in depth from a few inches to a foot or more, is of service in *its capacity to absorb and store moisture*. The surface layer, two to four inches deep—which may be conceived of as a chocolate icing for our cake—contains the roots of the grass plants and the food which most support them.

Please note particularly the words in *italics* above. The value of the soil which lies deeper than three or four—or at most five—*inches* below the surface, depends entirely upon its mechanical condition, its capacity for water absorption; the moisture which is absorbed and held is returned, through capillary action, to the surface layer, as the latter begins to dry out. For lawn making, *any plant food added to the soil more than three or four inches deep, is largely if not absolutely wasted*.

It has been my experience that maximum results in grass growth are attained when *all* of the manure, humus, and fertilizers used, are concentrated in the top two to four inches of soil. In this connection, it should be kept in mind that all the soluble plant foods in the soil—the only ones which are available for the immediate use of the plants—are carried deeper down into the soil by every rain or heavy watering. The more humus there is in the surface layer of soil, the greater the percentage of these foods in liquid form which will be absorbed and held within reach of the grass roots, instead of being carried down and lost. For some time my own practise in making lawns on small areas has been to prepare a special rich fine soil or compost, which is applied two to three inches thick to provide an ideal seed bed, after the lawn has been prepared and graded (see page 37).

DRAINAGE

The few grasses which will survive in really wet soil are coarse in growth, with a tendency to form clumps or hummocks, and are, therefore, not desirable lawn grasses. For this reason, good drainage is the first essential in building a lawn.

If the soil where the lawn is to be made is actually wet, due to poor under-drainage, artificial drainage by tiling or other means must be provided; or the grade raised by filling in until the surface is four to six inches above the normal water level in the soil. If poor drainage is the result of a hard-pan subsoil, which prevents the surplus water from draining through, this condition may usually be remedied by sub-soiling, blasting with agricultural dynamite, or, on small areas, by breaking up the hard-pan with a pick.

Where poor drainage is due to too much clay, in either top soil or sub-soil, a remedy may be found in altering the character of the soil (see page 30). Ordinarily, at least for small lawn areas, a clay top-soil is the condition likely to cause trouble. One thing which must be guarded against, if an even, uniform lawn is sought, is variation in the drainage within the area to be planted. If such variations are suspected, the drying out of the soil after heavy rains should be carefully observed, and the slowest-drying spots marked for treatment. If these are merely depressions, they may readily be improved by filling in several inches of gravel, cinders, or coarse sand placed six inches or more below the surface.

Decreasing Drainage. Though seldom mentioned in garden or lawn literature, over-drainage is the cause of injury quite as often as under-drainage. Gravelly and sandy sub-soils permit the escape of water so rapidly that the soil moisture is not held for future use, and the plant foods, in solution, are carried away and wasted. The incorporation of either clay or humus with the layer of soil above the sub-soil will help to check the too rapid escape of moisture. If clay is used, the deeper it can be worked into the soil, to a depth of six inches or so, the better, as it is not desirable to have it too near the surface. Humus, in the form of manure or any similar material, on the contrary should be kept fairly near the surface, preferably within the upper four or five inches, unless so much is used that this would make the surface soil too light and open.

GRADING

We have already mentioned the desirability of obtaining a pleasing slope in grading a lawn (see page 14). It is, however, not for the sake of appearances only that grading is important. Surface drainage—that is the flow or run-off from the surface of the soil in spring, and during heavy rains—is very important, especially in hilly sections, or where the surface soil is made up largely of clay. Where possible, the grade should be made so gradual that most of the water will be absorbed by the soil *where it falls*, instead of running rapidly from the surface. Where some surface run-off must be taken care of, the grading should be so carefully planned that it will be carried away without collecting anywhere in hollows or low spots, but without developing sufficient headway at any point to wash out turf or to deposit soil over it.

On large places, or where unusual problems are presented, the services, or at least the advice, of someone who is familiar with drainage work should be sought. On the average small place, the home owner himself may, without difficulty, handle his own drainage problems.

The mechanical side of the job of establishing a grade is not difficult. It should be done as follows (see illustration on page 29):

Two substantial stakes of suitable height are driven into the ground at opposite extremities of the section to be graded (A—B). The height to which the surface of the soil is to be built up, or cut down, at one stake, is determined, and a permanent mark or a notch made at a convenient height above this level (D). A stout cord is then stretched from this notch to the other stake (C), and levelled on it by means of a “line level”—a small spirit level in a metal tube about three inches long, provided with a hook at either end so that it can be suspended from the cord. A line-level costs but about sixty cents, and is useful for many purposes around the place. An ordinary carpenter’s or mason’s level can be used, but the line-

level is both more convenient and more accurate. Other stakes (E, F, G) may be driven at convenient intervals—say ten feet—and the grade marked upon each by measuring *down* from the line. Grade lines may be run in as many different directions as necessary from the original stake. For large areas, the grade mark may be obtained by sighting with a spirit level instead of using the line; but for anything under an acre, the latter will be found to be more convenient.

In bringing the soil surface up to grade, it should be kept in mind that a certain amount of settling will take place. One to two inches, according to the character of the soil, and whether it is thrown in loosely or packed down fairly firmly when put in place, should be allowed to take care of this. It is of decided advantage to do the grading several weeks in advance of sowing the seed; otherwise, the soil should be watered two or three times, until it has been soaked through and through to hasten the settling. Watering also checks the accuracy of the surface grading as the water will run to and collect in low spots.

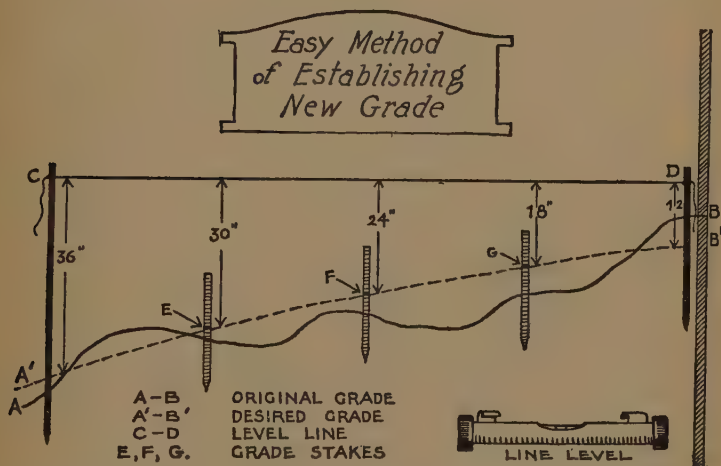
Where a slope is to be made, instead of a level grade, a line is stretched level in the same way as described above, and the difference between the levels desired at the two points is determined by measuring. This difference, *in inches*, divided by distance between the two stakes, *in feet*, is the “fall” or “grade.” For example, if there is a difference of twelve inches between the grade levels at two points twenty-four feet apart, the “grade” between them would be one half-inch to the foot.

To establish grade marks for making a sloping grade of this sort, other stakes or markers are driven between the two terminal stakes at regular intervals of five to ten feet. For convenience it is well to make the distance between them uniform and such as will divide evenly into the total distance to be covered—they may be placed six feet apart, for instance, if the total distance is twenty-four feet. One may then measure down from the level line, calculating the difference in grade at each point, and marking the stake accordingly. (If, for example, the grade is one half-inch to the foot and the stakes are six feet apart, each successive grade mark would, of course, be

three inches lower than the one preceeding it. If a rounded slope is desired, the eye may be trusted to determine the surface of the grade between stakes.)

In grading an uneven surface, one should try to make the "cuts," where the soil is to be removed, equalize, as nearly as possible, the "fills," where the soil is to be deposited.

One of the things to watch particularly in grading around a new place is the filling in of the ditches which have been dug



for water, gas, or sewer pipes. These will always settle considerably, leaving objectionable depressions long after the work is done. Settling them with water, after they have been filled, and then re-filling on the surface, repeating the same process two or three times if necessary, will prevent their causing trouble later on.

Saving Large Trees. Often where grading is being done, large trees are needlessly sacrificed by having the soil dug away from around their roots, or filled in around the base of the trunk. Unless the cuts or fills are excessive, it is almost always possible to save such trees, either by leaving a low spreading mound of soil about the base of the tree when removing the soil,

or if raising the grade, building a "dry well" about the bole of the trunk, so that an air space may be kept open down to the roots. (The details of this work are illustrated in sketches on opposite page.)

SOILS, AND THEIR IMPROVEMENT

The soil with which we have to begin in making a lawn usually consists of two strata or layers, which differ from each other decidedly. The first of these is the top-soil which contains more or less plant food and humus, derived either from previous cultivation, or from decay of natural plant growth upon its surface. Below this is the sub-soil or raw soil, too "poor" in its natural condition to grow much of anything. The top-soil varies from two or three inches to a foot or more in depth.

Both top-soils and subsoils vary considerably in character in different locations. It is not feasible to attempt to alter much the character of a subsoil. With the top-soil, however, or at least as much of it as we need to take into account, a great deal may be done. In fact, there is no type of top-soil which, by the proper treatment, may not be made passably suitable for growing a lawn.

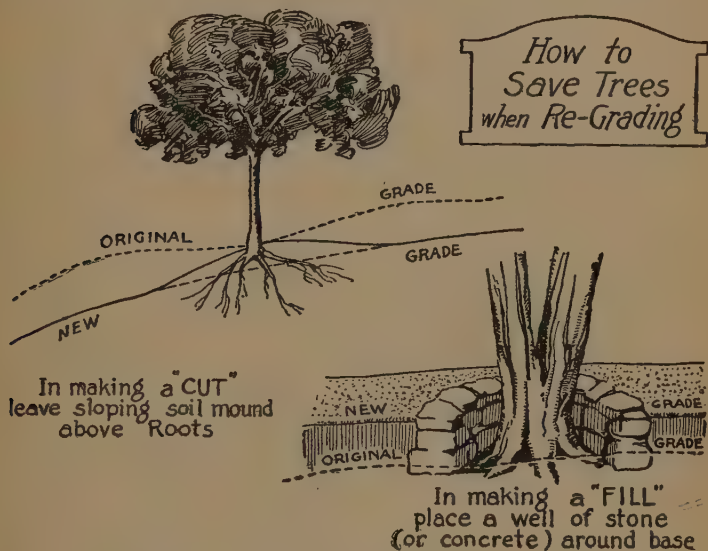
Subsoil Types. The ideal subsoil is a compact, sandy or gravelly loam which, while permitting surplus water slowly to percolate through it, tends to hold it back; loose sandy or gravelly subsoils are like sieves through which the surplus water passes immediately, taking with it, in solution, expensive plant food. Hard clay subsoils, within eight to fifteen inches of the surface, may be broken up with a subsoil plow in large area operations, but this is not so often necessary for growing grass as for planting shrubs or fruit trees.

Top-soil Types. The ideal top-soil is a deep loam. Loam is a combination of sand and clay—the two extremes in soil types. It contains also decayed vegetable matter or humus.

Very sandy soils are objectionable because they do not retain either moisture or plant food, the particles being so coarse and loosely combined that water escapes almost immediately. Clay soils are objectionable because the soil particles are so fine that

they "run together" when wet, making a substance through which water can pass only very slowly if at all: when dry, they bake hard.

The most direct way of improving either sand or clay soils is to add soil of just the opposite type. An inch of ordinary sand, worked into the upper four or five inches of a stiff clay soil, will work wonders in modifying it. Clay, or heavy loam,



which it is easier to incorporate, will greatly improve a sandy soil. Both are immensely benefitted by the addition of humus; it absorbs and holds the moisture that would otherwise escape too rapidly through a sandy soil, and opens up and makes more friable a clay soil.

It is not always possible to obtain either sand or clay to modify a soil of the opposite type. Other materials which may be used to improve a sandy soil are good garden loam, peatmoss, commercial humus, leaf mold, muck from a pond or stream bottom, and decayed hay or straw or grass clippings. To a clay soil one may add wood ashes, sifted cinders, land plaster

or gypsum, and also any humus-forming materials, the latter being beneficial to clay as well as to sandy soils.

Acid and Alkaline Soils. So far we have considered only the mechanical or physical properties of the soil, irrespective of the interesting subject of plant food. Before we get to the latter, however, there is another important thing to be mentioned: that is the chemical reaction of different soils. This is to be kept in mind in most kinds of gardening, but especially in lawn making.

Some soils are acid reacting and others are alkaline reacting; they are sometimes spoken of as being either "sour," or "sweet." These descriptions do not exactly fit. Any of the types of soils described above may be either acid or alkaline reacting.

The reason why this point is especially important in lawn making is that *the majority of lawn weeds grow most vigorously in alkaline soil.* On the other hand, many of the best lawn grasses, such as the bents and fescues, prefer an acid soil. The most important exception is Kentucky blue grass, but fortunately this will do well in a neutral soil—that is, one not extremely alkaline. It is possible, therefore, by obtaining a soil which is neutral or slightly acid, to both encourage the growth of the grasses and discourage the growth of the weeds, thus actually killing two birds with one stone.

The degree of acidity of the soil can be controlled. The first step is to determine the existing condition of the soil in this respect (see page 19).

To Lime Or Not To Lime? For many years the standard method of changing an acid-reacting soil to an alkaline or sweet condition has been to add lime, in the form of either dehydrated lime or ground (pulverized) limestone. While the very generous application of lime has long been advocated, recent experiments in turf growing, such as those conducted by the Federal Department of Agriculture at Arlington, have demonstrated conclusively that even Kentucky blue grass, commonly considered a lime lover, will grow vigorously in a neutral soil well supplied with humus and plant food; the same is true of white



Making a lawn: applying the compost top layer two inches deep over entire surface.



Making a lawn: (above) Sowing the seed in strips marked off for even distribution. (Lower) Rolling the surface after lightly raking in the seed, preparatory to watering.

clover. Another objection to the use of lime is that it rapidly burns out the humus in the soil, which is so essential for vigorous growth.

Except where the soil is extremely sour to begin with, it is best to use no lime at all in the preparation of the soil before seeding. Excessively acid soils may be made merely neutral or slightly acid by a moderate application of dehydrated lime, 500 to a 1000 pounds per acre—two to four pounds to one hundred square feet—used as far in advance of seeding as possible; or double this amount of raw limestone or of gypsum. The former is preferable where quick results are needed; the latter, if the soil is being prepared some time in advance of seeding.

No lime should be applied at any time of the year to the surface of an established lawn: it is not essential to the growth of the grasses, encourages weed growth, and destroys humus.

Soil which has been heavily limed, or is naturally decidedly alkaline in reaction, may easily be made neutral, or slightly acid, by the application of aluminum sulphate, which has exactly the opposite effect from lime. It may be applied in the same way. Moss, leaf-mold, and compost made largely from leaves, are all moderately acid and, therefore, doubly beneficial when used on a "sweet" soil which is being prepared for lawn purposes.

MANURES AND FERTILIZERS

It should be realized that lawn turf is made up of an infinite number of individual grass plants, crowded closely together, each of which must be supplied with sufficient nourishment or plant food to maintain it in good condition. Also that the growth, and removal of the tops by cutting, makes a constant and heavy drain upon the supply of plant food in the soil—as much as any crop of vegetables or farm products. Not only should the soil for a lawn be well supplied with plant food before it is planted, but this supply must be constantly replaced for the best results. In lawn culture the part of fertilizers and their application is, therefore, all-important.

"Manures" and "Fertilizers." In the broader sense of the

terms, manures and fertilizers are synonymous. As ordinarily used, however, the former word designates such materials as cow, sheep, horse, or poultry manure, and the latter, finely ground and highly concentrated chemical materials, or animal or vegetable by-products.

The difference between manures and fertilizers is important in gardening of any kind, but especially so in lawn culture.

Our first object in adding either manures or fertilizers to the soil is to increase the amount of plant food, especially the elements of nitrogen, phosphoric acid and potash, which are the three most likely to be deficient, and which are required for the maintenance of maximum growth. Manures, however, serve a secondary purpose in that they supply humus in addition to plant foods. In stable manure the humus will be quite as beneficial as the small quantities of plant food contained. The chemical fertilizers—such as nitrate of soda, a natural nitrogenous salt; acid phosphate, which is made from a rock containing phosphorus; and the potash salts—add no humus to the soil, and sometimes injure rather than improve its mechanical condition. The organic fertilizers—that is those derived from animal or vegetable sources, such as dried blood, which contains a high percentage of nitrogen; bone, which contains both nitrogen and phosphoric acid; and tobacco fertilizer or wood ashes, containing potash—do, on the other hand, add some humus to the soil, and improve its mechanical condition. Moreover, they are much safer to use as they will not “burn” either the foliage or the delicate feeding roots of the plant.

Green Manures. Certain plants are grown especially to be plowed or forked under with the object of improving the soil. They are of value chiefly for the great quantity of humus which they supply as they decay. Their most practical use is in the preparation of lawns of large area, where it is difficult to obtain good stable manure or mushroom soil, which may be used in place of the former. Rye alone, or rye and vetch together, sown in late August or September, and plowed under the following April or May, succeeded by a crop of soy beans or cow

peas, plowed under in July or early August, will make an ideal foundation for a lawn to be planted in late August or September. In plowing, care should be taken not to turn the furrows over flat, but to lay them at an angle, so that the green material will be well mixed through the upper five to seven inches of soil. The resulting supply of humus will form a water reservoir of immeasurable value to the future lawn. It should not be counted upon, however, to furnish the plant food needed by the grasses, as much of this will be below the reach of their roots.

Humus. Humus, or decayed vegetable matter in the soil, is essential to good growth, not merely because it acts as a moisture reservoir, but also because its presence is necessary to the development of certain soil bacteria which help break down and make available for root use the plant food elements in the soil.

Where neither stable manure, mushroom soil, nor a green manure crop can be used, it is of the utmost importance to find some other source of humus.

For this purpose, granulated peatmoss, which comes in bales containing eighteen bushels or so, is ideal. It is the most absorbant of all humus forming materials, and being slightly acid in reaction, helps to create just the proper soil condition. Commercial humus, a light, black, prepared soil, which may be purchased either in small quantities, or at a low price in bulk, is also excellent. Leaf-mold or wood's earth, which may be had for the gathering in many locations, is another valuable source of humus, as is also the compost heap.

PREPARING THE LAWN FOR PLANTING

Having thus considered at some length—as the importance of the subject merited—the things which should and should not be done in building the foundation for the lawn, let us take up briefly, step by step, the actual carrying out of the work.

When to Prepare the Soil. As will be shown later, the best time for planting a lawn is in the autumn. It is however advantageous to do all the work of preparing the soil, except the final finishing off of the seed bed, some weeks, or even sev-

eral months, before sowing the seed. Where a lawn *must* be planted in the spring, the chances of success will be greatly increased if the soil can be prepared the fall previous. If not, it is of the greatest importance to do the work at the earliest possible moment in the spring.

Subsoil and Drainage. These are the first things to tackle in starting work on the new lawn. Any work of this sort required may be done immediately when the lawn has been definitely planned, even if it is not to be completed for a season or two. Get this out of the way, if possible, while the place is still torn up for building operations.

Grading. Grading comes next, and as this is another preliminary task, it may be done at any time, though for practical reasons it is usually delayed until building is completed. Where there is much filling to do, it is well to allow time for the settling of the soil between the rough grading and the application of the top-soil, which is to be brought to the final or true grade.

The Top-Soil. As distinguished, for our purpose here, from the surface-soil (see page 37)—has as its chief function the absorption and storage of soil moisture. It should, therefore, have added to it all the humus which it is possible to obtain, by any or all of the methods which have been suggested previously. Preferably it should have a minimum depth of three to five inches, if a layer of surface soil is to be added later, and more, if not. The more porous the subsoil, the more important the depth of the top-soil.

It is not only a waste of labor and material to add fertilizer elements to the top-soil (as distinguished from the surface), but actually a disadvantage, for deep-rooting weeds will riot in this store of plant food that is out of the reach of the lawn grasses.

The Surface Soil. This is the top layer, two to three inches deep, in which the grass plants make their start and find their future sustenance, and in which *all* the plant food, plus an adequate supply of humus, should be concentrated.

This surface layer may be prepared in one of two ways:

The Foundation for a Good Lawn



The chocolate layer cake that will produce a good lawn!

First, by applying plant foods and humus materials to the surface of the top-soil, after it has been brought to grade, and working them as shallowly as possible.

Second, by preparing a separate compost of top-dressing to be applied over the surface of the top-soil, after the latter has been brought to approximate grade. This method the author has used for several years in constructing moderate-sized lawns, believing it to be the best preparation possible for quickly establishing a successful turf.

Manure or other forms of humus to be incorporated in the surface layer—the first of the two methods just described—should be sufficiently fine to mix with the soil or to be harrowed or raked in, evenly and smoothly, leaving no lumps or trash of any sort. It is well to give a second rolling after the manure or humus has been applied, both to compact the soil and to show up any uneven places. The fertilizers may then be spread on broadcast, and raked in. While there are many materials available for this purpose, my own preference is a mixture of fine bone, or bone flour, and extremely coarse bone, in equal parts, to supply nitrogen and phosphoric acid, and tobacco fertilizer or wood ashes to supply potash. The bone is applied at the rate of three to five pounds to one hundred

square feet; the tobacco fertilizer about twice as heavily, and the wood ashes some three times as heavily. These should be merely raked into the surface of the soil.

Preparing the Top-dressing Compost, or "Chocolate Layer." The photographs facing pages 17 and 32 illustrate the preparation and application of the special surface dressing—the second of the two methods mentioned. This gives decidedly better results than the usual method of preparing the seed-bed, described in the preceding paragraph.

A quantity of the best top-soil obtainable is mixed, in the proportions of two to one, with granulated peatmoss, commercial humus, well-rotted manure compost, or leaf-mold; if more than one of the last mentioned materials is available, so much the better. The mixing is done by shoveling the soil and the humus material through a medium mesh screen; this gives a fine, loose, spongy soil, which can be spread evenly; which will not dry out, bake or crack while the seed is germinating; and in which the tiny roots of the sprouting grass seed will find congenial conditions for rapid development. Any fertilizers used may either be mixed with the top-dressing soil, or broadcast and raked in, after this layer is applied. The prepared soil may be put on from one to three inches thick; two inches is ample if the soil below it is in good condition. A layer but one inch thick will give the grass plants a wonderful start compared to the ordinary method. As to the cost, a single bale of peatmoss, mixed with soil in the proportion of two parts of the latter to one of the former will cover some seven hundred square feet of soil, with a surface dressing one inch thick. The peatmoss may be bought for four to five dollars a bale. For larger areas, mushroom soil, which may be bought, in carload lots, at five or six dollars a ton, is ideal to use in making the compost.

If the surface-soil can be prepared for seeding two or three weeks before the grass seed is to be sown, many of the weeds will sprout, and these may be destroyed by raking over the surface to prepare it for the grass seed, as described in Chapter VI.

CHAPTER V

LAWN GRASSES AND HOW TO GET GOOD SEED

THE number of grasses which are really well adapted to lawn making is small. Of the number which *may* be used, probably half are decidedly less desirable, for one reason or another, than the remainder. Unfortunately, several of these are commonly employed in inexpensive lawn-seed mixtures because they are cheaper, or add bulk or weight, with the result that the purchaser is deceived into thinking that he is getting more for his money.

Grasses suited for lawn-making are those which, first of all, are capable by themselves, or in combination with other grasses, of forming a real turf. Furthermore, they should be fine-leaved, and of a pleasant green color throughout the longest possible season. Grasses with rough foliage, those which tend to grow upright rather than to form spreading crowns at the surface, and those which form compact clumps with bare soil around the individual plants, should not be used. Permanency is also to be considered; as a rule, annual short-lived grasses are undesirable, although a small quantity may be permitted in a lawn grass mixture to give more immediate results.

More experimenting with grasses for lawn-making has been done in the last few years than in decades previously. This work has been carried on by several of the State experiment stations and at the Government test gardens at Arlington, near Washington. These experiments have demonstrated that some of the grasses which have been used for years for lawn purposes—as part of our inheritance of European garden lore—are either undesirable or unnecessary for American conditions. Progressive seed houses and grass specialists have been quick to profit

from this new information, and to change accordingly their grass mixture formulas and recommendations for lawn making.

CLOVER OR NO CLOVER?

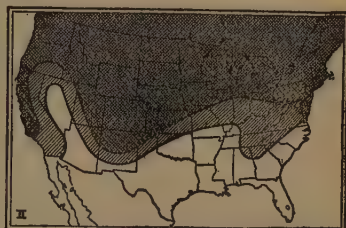
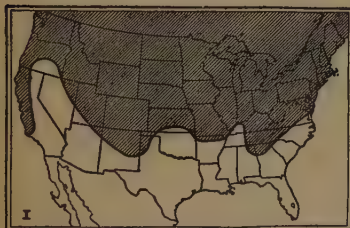
One of the moot questions in modern lawn making is whether or not clover should be used. Formerly, clover seed was included in practically every lawn mixture, and it still holds its place in most of them. The variety used for lawn purposes is the White or Dutch Clover (*Trifolium repens*). It has very small leaves, and sweet scented, small white blossoms, and as its name indicates, is of creeping habit (see illustration page 22). On well prepared soil which brings vigorous growth of the grasses, no clover is necessary to obtain a thick, green turf. On rather poor or sandy soils, clover, undoubtedly will improve the texture of the turf. One objection sometimes made to clover is that it crowds out the other grasses. This is not correct; the clover merely comes in where grasses are *not* growing, and occupies bare space which otherwise would probably be infested with weeds. Another argument made against clover is that it will grow only on a well-limed soil which is otherwise undesirable for lawns. I have not found this to be so; it will grow freely wherever wood ashes in a moderate amount have been used, and the slight amount of lime added, especially if the ashes are applied to the surface and *not* worked in deeply, will have no effect in stimulating weed growth.

Whether clover should be included is really a matter of taste. Personally, I like a moderate amount of clover in a lawn. Most of the growth is made below the level—about two inches—at which the grass should be kept cut, with the result that the lawn has a greener appearance immediately after cutting than when no clover is used. Clover helps to make a carpet-like, springy and sweet-scented turf. Even if clover is desired, however, there is no great advantage in getting it in the seed mixture; the clover seeds are heavy and smooth and likely to work down through the grass seeds, resulting in an uneven distribution when sowing (see photograph facing page 33).

THE MORE IMPORTANT LAWN GRASSES

There is no one grass which is "best" everywhere and for all purposes, because soils, climate, and the particular qualities wanted in a lawn, all vary.

The grasses discussed below, except where noted otherwise, are suitable for the East, North-east and Central-west. The accompanying diagrams indicate the regions to which some of the most important lawn grasses are best adapted:



Courtesy U. S. Golf Ass'n.

MAP I.—KENTUCKY BLUEGRASS, REDTOP AND WHITE CLOVER. The hatched area is that in which Kentucky bluegrass succeeds best. White clover and redtop occupy the same area, but both thrive well much farther southward.

MAP II.—BENT GRASSES AND RED FESCUE. The double-hatched area is that in which creeping, velvet, and Rhode Island bents, and red fescue succeed well; the single-hatched area, that in which they need good care to succeed, although red fescue rarely succeeds south of the double-necked area.

MAP III.—BERMUDA GRASS. The double-hatched area is that in which Bermuda grass succeeds best; the single-hatched, that in which it competes with blue grass and other grasses.

MAP IV.—CARPET GRASS.—The hatched area is that to which carpet grass is adapted.

The Meadow (Poa) Grasses. While there are several of these listed in the catalogs, the variety which predominates for lawn use is Kentucky bluegrass (*Poa pratensis*)—sometimes called “June grass.” This forms the backbone of all general lawn mixtures for Northern sections; it is spreading and permanent, fine-bladed, and of a beautiful color, except when, with insufficient moisture, it loses some of its freshness during mid-summer. It requires, however, considerable time to spread sufficiently to form a close turf, which is not attained until the second or even the third season.

Rough-stalked Meadow-grass (*Poa trivialis*), sometimes called “bird-grass,” is the best of all grasses for shady locations, where a fair degree of moisture is available. It should form from a half to two-thirds of shady place mixtures, or be added to a general mixture for sowing under trees.

The Bent (Agrostis) Grasses. This group of grasses, used increasingly in recent years, is characterized by their creeping stems or root-stalks, which provide a mat-like, smooth, uniform turf. Creeping bent (*a. stolonifera*) has superseded all other grasses for the making of putting greens, and bents form the foundations of sport turfs requiring extra hard wear. They have been advocated by some authorities as even preferable to bluegrass mixtures for home lawn-making. Being more particular in their requirements, and demanding considerable more care in fertilizing, top-dressing, and continuous cutting, they have not, however, superseded bluegrass to any extent for lawn purposes. Nevertheless the bents are being given an increasingly important place in general lawn mixtures. While not so deep in color as Kentucky bluegrass, they are perfectly satisfactory in this respect. From the character of their growth, they are more binding upon light or sandy soils.

While there are several strains of Bent grass, the ordinary Creeping bent seed offered is really South German mixed bent, a mixture of several species with only a very small proportion of Creeping bent, mixed with much larger percentages of Rhode

Island and Velvet bent. Seaside or Cocoos (*a. maritima*) is of spreading habit but does not form runners like those of real Creeping bent or its selected strains, such as Washington. The only way to obtain a genuine Creeping bent lawn is by cuttings of the creeping root-stocks or stolons. This has made it possible to secure true strains from selected plants, possessing particularly vigorous growth and other desirable characteristics. These selected strains have been used to establish much finer golf greens than were ever obtainable from seed. The same method is available for lawn culture, and is, under some conditions, desirable.

The popular Redtop (*Agrostis palustris*), while belonging to the Bent group, is different from the varieties discussed above, being only very slightly creeping. It is almost invariably used with Kentucky bluegrass, blending well with the latter and being at its best during late summer and fall, when the bluegrass has passed its prime. Like the other Bents, it develops more quickly from seed than Kentucky bluegrass, making a satisfactory showing the first season.

The Rye (Lolium) Grasses. These are all of value chiefly because of the quickness with which they develop from seed sufficiently to produce a green lawn. They help, also, to protect the finer grasses, during their early growth; but they are short-lived—a fact which has its advantages for some purposes (see page 79). Pacey's Perennial Rye Grass (*L. perenne pacey*), small growing with fine leaves, is the one preferable for lawn purposes.

The Fescues (Festuca). These are of much less importance for lawn-making than any of those previously described. Forming tufts, they do help, like the rye grasses, to produce a good turf quickly. They are somewhat more adaptable to shady conditions.

Probably the most useful of the several Fescues, is Chewing's New Zealand (*Festuca rubra folfax*) which has a somewhat creeping habit, and thrives well in moderate shade.

A more complete list of the grasses with brief descriptions of each is given in Chapter XI.

LAWN SEED "MIXTURES," OR SEPARATE VARIETIES?

One of the problems confronting the lawn maker is whether to sow only one or two varieties, or a mixture of several; and if a mixture, whether to make it himself, purchasing the varieties separately, or to procure one ready-made.

While the sowing of one or two varieties is sometimes advocated, there is no doubt that, for average conditions, a mixture of several sorts is more satisfactory.

For the benefit of the lawn maker who wishes to mix his own, a number of formulas are given in Chapter XI. An undeniable advantage of home mixing is that one knows exactly what is being bought and planted. If a considerable quantity of seed is to be used, there may be a worthwhile saving in the cost, but for the moderate-sized lawn the purchase of a ready-made mixture, if it be of the best quality obtainable, will probably give more satisfactory results. Admitted that the seedsman's mixture will be made up largely of such leading varieties as Kentucky bluegrass, and the Bents, including redtop, there is still an advantage in having included small quantities of a number of the other sorts, because some of them are likely to find conditions exactly to their liking, and develop accordingly. As a single pound of any mixture contains literally hundreds of thousands of seeds, there is no danger that there will not be sufficient of the most desirable sorts, if they find congenial conditions; and if by any chance they do not, or as sometimes happens, are slow in becoming established, we are sure of having others to grow in their place. Dense turf *from the start* is the surest method of keeping out weeds, and if Kentucky bluegrass or one of the bents is going to succeed at all, it will eventually take possession of the lawn no matter what other grasses are sown with it.

GOOD VERSUS POOR SEED

It is of the utmost importance to have *absolutely* the best seed procurable. This need not necessarily be the most expensive

to be found, but you may rest assured you will not get it in a cheap mixture—it is in these that the actual amount of good seed of desirable varieties really costs *most*. Even if the waste in cheap seed were nothing but chaff and dead seed, it would make them too expensive for anyone to afford—but that is only half the story. They are almost certain to contain weed seeds, and in using them, one sows the seeds of failure at the start.

Some recent official investigations have shown, in thirteen samples of mixtures bought, an average of over 60,000 weed seeds to each pound! This, coupled with another analysis which showed that only ten out of eighty-eight samples examined contained fifty per cent or more of Kentucky bluegrass, while in twenty-six of them Timothy—a hay and pasture grass, wholly unsuited for lawn purposes—predominated, should be sufficient to put anyone on guard against the cheap mixtures distributed through such channels as department and chain stores, and, it must be admitted with regret, sold in some seed stores.

The weight of a mixture may give some indication of its quality, as a good mixture should weigh twenty to twenty-five pounds to the bushel. Weight may be gained, however, by adding clover or timothy seed, which weigh approximately twice as much as Kentucky bluegrass. Your seedsman should be willing to tell you what his grass seed mixture contains. If he is not, you will probably do well to look elsewhere.

CHAPTER VI

PLANTING THE LAWN

CARELESS planting may result in the failure of a lawn even though the foundation has been carefully built. If a seed mixture from a reliable source has been used and a good "stand" of grass is not secured, the planter may be quite certain that the trouble has been with his methods rather than with the seed. Often the germination percentage is given; in some states it is required; but even when it is not stated, one may rest assured that under favorable conditions germination will be satisfactory if *good seed* is used.

When to Plant. The time of planting is of much greater importance than ordinarily realized. It may, and in fact very often does, mean all the difference between complete success and partial or even absolute failure.

So far as seed germination is concerned, a lawn may be started at any time of the year when the ground is not frozen. But during the season when hot or dry weather is likely to be encountered—from the middle of May to the Middle of August in most sections—much more attention will be needed than either before or after these dates. The tiny grass roots, developing near the surface, will perish quickly from lack of surface moisture, and the foliage itself may be seriously injured by "burning."

Grass growth, however, is not the only thing to consider. The most important reason why fall planting—late August to late October—is preferable to spring planting—March 15 to May 15—is that *most lawn weeds start in May or June*. Being more vigorous in growth during the early stages, and

rooting deeply, they have every opportunity to establish themselves and crowd out the shallow-rooting grass plants. This is especially true of crab-grass, the peerless leader of all lawn pests, the seeds of which germinate during May and June, if they are near the surface, or even in July or August if brought to the surface by the stirring of the soil. Usually they do not germinate late in the season; or, if the plants do start, they are killed by the first touch of frost.

Another important reason for fall planting is that, with the approach of cold weather, most grasses tend to stool out or tiller, forming low-spreading crowns or tufts. The difference in this respect in the growth of young grass plants started in the spring and in autumn is so great that they almost appear to be different varieties.

Still another practical reason for fall planting is that there is then time to do the work more carefully and thoroughly than in the rush of the spring season, when a score of other tasks are demanding attention.

The advantages of fall planting are so important that one should not consider making the lawn at any other season, even though it may be necessary to go without a lawn, or to make a temporary one, for the first summer.

VARIOUS METHODS OF PLANTING A LAWN

Although probably ninety-nine lawns out of a hundred are grown from seed, this is not the only method of planting. A lawn may be established also by transplanting sod, or by planting stolons or cuttings of such sorts as Creeping bents, or small pieces of sod of other kinds, like Bermuda grass.

Seeding is the least expensive in money and labor, and on the whole the most practical for the average home owner. Sodding has the advantage of giving immediate results; it is the most expensive and the least available, because of the difficulty of getting good sod, unless the turf is grown on the premises for the purpose. Its chief value to the ordinary home owner is for the planting of small areas, particularly terraces and other

difficult locations, and various places subject to immediate hard wear. It is an excellent method of outlining beds, borders or walks, in a newly seeded lawn (see page 49).

Stolons, or cuttings, while less expensive than sodding, are much more expensive than seed; but they make it possible to use selected extra fine strains of the bent grasses and give quicker results than may be obtained from seeding. More expert care is necessary, however, both in the planting and in the after care of the so-called "super-lawns" obtained by this method.

Seeding. With the soil prepared for planting as described in Chapter IV, the surface needs only a final raking over to loosen it and remove any litter or large lumps of soil or humus, before sowing the seed. This should be done with a back-and-forth movement of the rake to give a surface perfectly smooth and level. If the soil is dry, water *very* thoroughly and give a final raking after the soil has dried sufficiently not to be sticky.

For large areas, it is best to use a wheelbarrow sower or some other mechanical distributor. The seed should be divided into two parts, the second lot being sown at right angles to the first. It is important to do the work while there is no wind; very early in the morning or about sundown if the days are windy.

Small lawns, however, will be sown by hand. Marking off the area to be planted, with white cotton twine and small stakes, into strips six to ten feet wide, will aid greatly in getting an even distribution. The seed should be separated into two, or even three parts, sowing it across one way, again at right angles, and a third time diagonally. In sowing, hold the index and second finger partly open, leaving a wide aperture, so that the seed may be distributed from the hand with an even swinging motion, in a cloud. One pound to three or four hundred square feet, or one hundred pounds—four to six bushels—to the acre, is generally used. (See illustration, facing page 33.)

After the seed is sown, it should be raked in very lightly, and then pressed into the soil, either with a fairly heavy roller (two to three hundred pounds) or, on small areas, beating down the soil with the back of a flat shovel, snow shovel, or a coal scoop. A method of firming the soil used abroad is to secure to the feet,

*Methods of
Planting*



With Seed



With Sod



With Stolons

by means of rope, two pieces of board about twelve by eighteen inches, and walk over it.

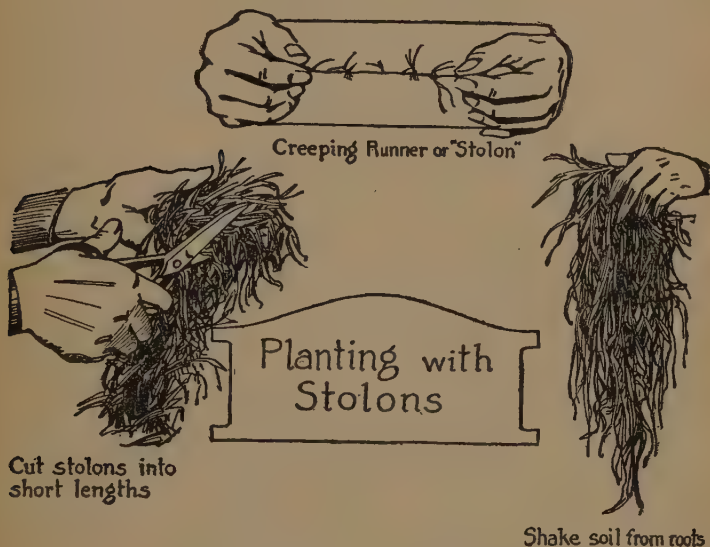
Immediately after rolling or otherwise firming-in the seed, the soil should be watered *gradually*, and very carefully, so that no water collects upon the surface. If the soil is dry it is better to give a light watering even if there is prospect of rain, for if it come suddenly it is almost certain to run and form pools before soaking in.

Nurse crops, such as oats or rye, are sometimes advocated, especially with spring sowing. If the seed mixture contains rye grass or even redtop, these will provide all the nursing necessary for the finer grasses. My last experience with a nurse crop was planting oats on a lawn of several acres on a large estate. The owner insisted upon this being done on the theory that the oats, sprouting quickly, would provide desirable shade for the grass plants. A fine stand was secured and everything went finely until the oats had to be cut. Some scorching hot days followed a week or two later, and the tender grasses, without the shade to which they had become accustomed, were literally burned up.

Sodding. Preparation of the soil for sodding should be in every respect the same as for seeding, except that it is even more necessary to keep the plant food *near the surface*, as an inch-and-a-half to two inches of soil will be added with the sod.

In procuring the sod, the greatest care should be taken to obtain a turf suitable for lawn purposes. Pasture sod, which may look well at the time, is usually composed of grasses unfit for lawn use. In some localities, it is possible to purchase sod grown for the purpose. If sodding is anticipated, very much the best method is to grow turf in some corner of the place which can be spared for this use. The sods, or turves, are usually cut in strips one foot wide and two to three feet long. A board twelve inches wide, with straight edges, is convenient for cutting them. A special tool known as a "sod cutter" is best for this work, but for a small quantity the edges of the sod may be cut with an ordinary turf edging-knife, and the sod then cut underneath and lifted with a sharp spade.

In laying sods, the bottoms, if hard and smooth where they were cut out, should be somewhat loosened up that they may unite better with the surface on which they are laid. The edges, of course, should be fitted together as closely as possible, and the sods beaten down into place, either with a tamper or the back of a spade. This should be done as they are put down.



When a section is finished, the whole surface should again be gone over, preferably with a very heavy roller. Follow this with a watering, so thorough that the sods will be thoroughly wet through. As soon as they are dry, they should again be rolled or beaten as firm as possible.

Stolons. A stolon is a creeping runner, with nodes, or joints, at short intervals, at each of which a new plant is formed. Many plants have this habit of growth. The vigorous crab-grass is one. Bent grass stolons produce joints every one-and-a-half to two inches. They give a more thickly knit and carpet-like turf than that produced by any other form of lawn grass.

In planting by the stolon or "vegetative" method, the soil should be prepared as for seeding. The stolons, which may now be obtained from some seed houses, and from bent grass specialists, are procured from the nursery, where the plants are grown in cultivated rows and shipped in bags. Before planting, they are prepared by being clipped or chopped into pieces, an inch-and-a-half to two inches long. For a small quantity, shears may be used; but a fodder cutter, such as farmers use to cut corn stalks and other feed crops, is better for a large amount. Stolons may be chopped ready for planting before being shipped. This is more convenient for the lawn-maker, but they will dry out and be injured more quickly than if the plants are transported with some earth adhering. In either case, the roots must never be allowed to dry out during transportation and planting.

One square foot of bent grass plant will produce clippings sufficient for planting eight to ten square feet. Scatter the clipped stolons over the prepared surface evenly. Follow this *immediately* by rolling, to press the clippings into the soil. After rolling apply one-fourth to one-half inch of sifted compost, just enough to cover them and hold them in place. This, in turn, should be immediately rolled down. As these operations must all be carried out quickly to prevent the drying out of the plants, it is well to have at least two men, and still better three, work together on the job. It is estimated that three men can plant ten to twelve thousand square feet in a day. If the work cannot be so arranged that there will be no undesirable tramping over the planted area, planks should be used.

Immediately after planting, water thoroughly with a very fine spray which will not disturb the cuttings. Watering should be repeated daily—in very dry weather twice a day—for at least two weeks, the time required for the formation of new roots.

PLANTING SLOPES AND TERRACES

All the directions given apply to level surfaces or moderate contours. The planting of steep banks and terraces is much

more difficult. The best method to use, if possible, is sodding. If the whole area cannot be sodded, strips six inches wide, laid in rows lengthwise with the terrace, or better still in squares, at intervals of two to four feet, aid greatly in preventing the grass seed from becoming washed by rains or watering. A thin sprinkling of oats, sown with the grass seed, form vigorous root systems rapidly and will help to hold the soil in place. Pieces of burlap, or burlap sacks cut open and spread over the soil after planting, pegged into position, afford protection; they must, however, be removed quickly at the first sign of germination of the grass seed—ten days or so.

Stolons are *not* well adapted to terrace planting, and there is no advantage in using Bent grasses for this purpose.

CARE AFTER PLANTING

Whatever method of planting is used, the one essential for from four to six weeks after planting is *never* to let the surface dry out. This will require careful watching. Bright sun is not the only enemy to be guarded against, as winds are even more dangerous. Many a lawn is carefully prepared and looked after up to the germination of the seed; a single day's neglect then may mean the drying and hardening or crusting of the soil surface, with the consequent destruction of a large proportion of the tiny grass plants. The finer varieties are the first to perish, having been slower to germinate and being more delicate at the start.

Heavy watering is not necessary at this stage. What is needed is light applications, wetting the soil an inch or so in depth, applied in as mist-like a form as possible—quite different from the kind of watering desirable later on.

Protection of the newly planted surface from careless workmen, animals, and children should also be provided. Too often this is not thought of until after the damage has been done. Don't trust to a "Keep Off the Grass" sign; put up temporary stakes and string wire or stout cord around the area. If dogs or chickens must be guarded against, mesh wire fencing of suitable height must be kept in place for several weeks.

CHAPTER VII

CARE OF THE LAWN

GRASS, as has already been pointed out, must be looked upon as a growing crop, and like any other crop requires methods of culture adapted to it. Speaking of the lawn as a "carpet" of green, we are prone to forget that this particular carpet has roots, and must be fed, cultivated, and protected from its enemies like any other plants about the place. The fact that the culture required for grass plants differs from that accorded others makes it none the less essential.

In fact, if one stops to consider the situation a moment, it is evident that the grass plants must continue their existence under peculiarly difficult conditions. The digging up and enriching of the soil from season to season; the cultivation of the soil during spring and summer to destroy weeds and to conserve moisture; the application of a mulch in summer for the same purpose, or in winter to afford protection, is out of the question. Moreover, the plants must withstand wear and tear to which nothing else is subjected. Altogether we ask a great deal of the tiny plants which go to make up our lawns.

If in preparing the soil for seeding, an adequate amount of available nitrogen has been provided, no care other than watering will be needed for from one to two months after planting. If when the young grass has come up, it does not seem to start quite as vigorously as it should, or if there are some spots which appear backward, or a lighter green in color than the average, then either a general or a local application of one of the "stimulants"—fertilizers particularly rich in available nitrogen, such as nitrate of soda, sulphate of ammonia, or floranid, may be

made (see page 82). Bone flour used before planting (see page 83) should, however, supply all the nitrogen needed at this time.

MOWING

The first care of the newly planted lawn will be cutting the grass—an occasion looked forward to with the greatest interest. Do not, however, be in too great a hurry. Let the new growth reach a height of at least three inches, and one or two inches more will be helpful rather than otherwise, if the grass is not in danger of falling over and “lodging.” For the first cutting the lawn mower should be set as high as possible. And it should be *freshly sharpened*—the little plants are easily pulled out by the roots. A sickle or a sharp scythe may be used for the first cutting if trouble in this respect is experienced.

The intervals for subsequent cuttings will depend upon the rapidity of growth. An average of once a week is not too often in good growing weather. This time should be shortened or extended according to the growth made, rather than by dates. During dry periods, cut both less frequently and not so close. It is no more work, and often requires no more time, to mow a lawn once every week or ten days than to wait until the grass gets really long, and to have to push the mower through it—and sometimes *over* it—once every fifteen or twenty days. The latter method—too often practiced—both injures the grass and makes a ragged looking lawn, an unsightly brown in color for several days after cutting.

The clippings, ordinarily, are best left where they fall. They serve as a light mulch for the roots, temporarily deprived of the slight shade which the tops have furnished, and they return at least a trace of humus to the soil. Unless the grass is so long or so wet that the clippings collect in clumps or bunches, which will bleach or rot the grass beneath them, there is no reason for their removal. Keeping the mower permanently equipped with a grass catcher has nothing to recommend it but an over-developed sense of neatness.

About trees or shrubs much hand work with the grass shears or clippers (see page 76) may be saved by cutting out neat, but not too large, circles of sod, leaving the soil exposed; it is easier to cultivate this than to keep the grass trimmed, and better for the plants.

Where the lawn is fairly rectangular it is best, with each mowing, to change the direction in which the machine is run, cutting the grass each time at right angles to the way it was cut the time previously. Where the lawn is most conveniently mowed "round and round," the direction in which the mower is pushed can be reversed with each cutting; this keeps a smoother surface and also is better for the grass.

WATERING

The amount of watering advisable is governed by a number of factors, chief among which are the drainage conditions and the depth and water-holding capacity of the top-soil (see page 36).

Few lawns are watered too much, but many are watered too often. Very sandy soils over sandy or gravelly subsoils may require almost daily watering during extremely dry weather, but these are usually at the seashore or in other unusually sandy locations. Under such conditions, nothing is to be gained by giving more than a moderate amount of water at one time, for continued longer, it merely runs away through the subsoil, carrying with it much-needed plant food. Even here, however, enough water should be given at each application to wet through the top-soil.

On deeper and more retentive soils, a really thorough watering should keep the soil in condition for five to eight days even in dry, hot weather. The widely credited theory that watering during bright sunshine is injurious, and the corollary practice of giving the lawn area a wetting with a lawn "sprinkler" every second or third evening during dry weather, are absolutely wrong. These light sprinklings not only waste water by excessive evaporation from the surface, but encourage the growth

of new roots almost *at* the surface, instead of at their normal depth. Every time water is applied, it should be sufficient to wet the soil thoroughly *down to the subsoil*. A good watering apparatus (page 77) will save labor. Watering may be done effectively merely by using the open end of the hose, letting the water run out directly upon the grass, the position of the hose, of course, being changed from time to time. Whatever method is used, it is a good plan to divide the lawn up into four to eight approximately equal sections, marking them in some inconspicuous way, and watering these thoroughly one at a time in rotation. For large areas, the installation of a permanent irrigating system (see page 77) will pay for itself in the labor saved, and the watering will be done very much more thoroughly and evenly than by the hose.

TOP DRESSING

The term "top dressing" is usually loosely applied to two quite different operations. The first is the application, in the form of fertilizers, of plant food alone. The second is the spreading over the lawn of a compost which may or may not contain a considerable amount of plant food, but which adds humus and serves as a light mulch to the soil surface between the grass plants. The ideal way of applying the plant food needed to keep the lawn in first-class condition is in combination with this compost. Seldom if ever will it then be necessary to apply the fertilizer separately.

The compost for top dressing the lawn may be prepared at the time it is wanted by mixing together two parts of light loam with one of peatmoss, humus, or leaf-mold. If the lawn happens to be made on heavy clay soil, a considerable quantity of sand may well be included. If to a yard of compost, which should be screened before being applied, are added ten to fifteen pounds of sulphate of ammonia, twenty-five of bone meal, and fifty of cotton-seed meal, both the plant food and the humus requirements of the turf will be adequately provided for. A cubic yard of the compost will top-dress from three to five

thousand square feet of lawn. If but one application a year is made, put it on fairly early in the spring. This may, however, well be followed with another application in late August or early September, particularly for a bent grass lawn. The dressing should be lightly raked in with a wooden lawn rake, and then given a thorough watering to settle the particles about the roots.

If the top dressing is to be continued as a regular practice—and this is the best way to maintain any lawn in fine condition—a compost heap should be started and carried along as a routine part of garden operations. It really involves very little work, and will prove useful for many garden purposes besides lawn-making.

Fertilizers. If no compost, or compost without fertilizer be used to maintain the lawn, some fertilizer should be applied at least once each season, but preferably twice.

Lawn fertilizers are of two types: general mixtures containing all the three important food elements—nitrogen, phosphoric acid and potash; and those which act more as a special stimulant or tonic, valuable for the available nitrogen—the chief element in the production of foliage—which they contain. Sulphate of ammonia alone, at the rate of one-quarter to one-half pound to one hundred square feet, in the spring and again in the fall, will often give excellent results. But it is better supplemented by bone or cotton seed meal, at the rate of two to four pounds to the hundred square feet. As there is some danger of burning the grass with the sulphate of ammonia if it is not very evenly distributed and immediately watered in, it is best to mix it with several times its bulk of dry soil, sand or peatmoss when applying. (Other fertilizers and their special uses are mentioned in Chapter XII.)

Winter Mulching. The common practice of spreading half-decayed manure over the lawn in fall or early spring is unnecessary if the lawn is kept properly fed as suggested above. Furthermore, this practice is likely to introduce each year a fresh crop of weed seeds, kills out the grass in spots where large

lumps and clots of the manure lie, is unsightly, messy and disagreeable, and moreover is a flagrant waste of the manure! If you are so fortunate as to be able to obtain barnyard manure, add it to the compost heap, or mix it half and half with peat-moss, which will absorb and hold the ammonia given off, until it is sufficiently decayed to pass through a sieve; you can then use it for a spring or early summer top-dressing.

ROLLING

Rolling the ground very early in the spring, particularly if it is of the heavy type, likely to heave and loosen up from alternate freezing and thawing through the late winter months, not only improves the appearance of the surface but actually helps the growth of the plants by firming them back into place.

Aside for this, I doubt if the so-often-advocated frequent and continuous use of a heavy roller is of real benefit. Certain it is that many lawns are maintained in good condition without heavy rolling, and clay soils are often injured by it.

For large lawns, and of course wherever there is turf used for sports, such as tennis or other games, a roller is essential. As the roller is not needed very frequently, and requires no particular care, several neighbors may "chip together" to obtain one, where the lawns are not sufficiently large to justify individual ownership. A sod tamper, either purchased or home-made, will serve as a substitute for small areas.

SPRING WORK

One of the first lawn operations in the spring is to true up and trim the edges along all paths and drives, and around the flower beds, shrubbery borders, and trees. For this purpose a garden line, a straight-edged board—six inches or so in width—and a lawn edging knife with a straight handle terminating in a semi-circular blade, are quite necessary. Obtain an edger with a flat strip for pressing down with the foot—a small point but a very important one for the person who is using the tool. A circular edger is a great time saver, and very convenient for

cutting along cement walks. The ordinary garden scuffle-hoe is helpful in removing the trimmings, and cleaning off the edges or the sides of walks or drives, after the grass edges have been cut. The back of an iron rake, turned upside down, is serviceable for straightening and pushing back into place the edges which have been broken down or spread out from one cause or another. Neat straight edges will add greatly to the general appearance of the lawn. Though an all-around fixing up is desirable in the spring, the edges should be kept in good condition throughout the season. Avoid, however, cutting back too far into the turf; the lawn edges should come down to the walk or drive so that there is little or no bare soil exposed.

One of the biggest items in the care of the lawn is the elimination of weeds. This problem is sufficiently important to be given a chapter by itself.

CHAPTER VIII

WEEDS, PESTS AND DISEASES

OF the several sources of trouble for the lawn-maker indicated in the title of this chapter weeds are by far the most important.

The ideal of every home owner is a weedless lawn, and a lawn practically free from weeds is quite possible to attain under ordinary conditions. How few such lawns, however, are to be found!

The home gardener who has been led to believe that the only way of getting rid of weeds is to dig them out, upon hands and knees, may well be discouraged. This method alone will seldom, if ever, clear a lawn of weeds; for there will usually be ten to come in where each one is removed, the small spot of freshly stirred soil making an ideal place in which the seeds may germinate. Fortunately, there are other methods of solving the weed problem, both less laborious and more effective.

CAUSES OF WEEDY LAWNS

Why should the average lawn become so weedy? Are these unwelcome visitors from the Devil to provoke us to profanity, or are they sent by the Lord to keep our knees supple, and prevent us from becoming unduly proud of our handiwork?

No metaphysical explanation is called for. Weeds occupy our lawn because we provide or permit conditions which favor their growth. The three primary causes of their existence are thin turf, alkaline soils, and the distribution of weed seeds by the gardener himself.

Thin turf is the direct result of poor preparation of the lawn in the first place, and neglect in caring for it afterward. Lack

of sufficient humus or plant food at the surface of the soil, the use of poor seed or of unsuitable varieties, and allowing thin or bare spots to go unremedied, are all contributing causes. Weeds do not make poor lawns. Poor lawns make weeds! Absolutely the most effective way of keeping the weeds out is to maintain a thick turf, with the ground so fully occupied with grass plants that the weeds cannot get a foothold. This is not an idle theory but a practical fact, of which any lawn owner can take advantage.

(*Alkaline soils*, resulting usually from the excessive application of lime, directly encourage the growth of most of the worst lawn weeds.) This has been demonstrated beyond doubt by repeated experiments. (The frequent application of sulphate of ammonia, either alone or in connection with other fertilizers (see page 58) greatly encourages grass growth, and discourages weeds.) By the use of this material alone much may be done toward ridding the lawn of weeds. (The application of a top dressing of finely sifted leaf-mold, or of granulated peatmoss, accomplishes a similar double action result.)

Weed seeds are distributed over the lawn by the gardener in the top soil applied; in manure which is not so thoroughly decayed as it should be; and by the use of poor grass seed. Thousands of gardeners annually reseed their lawns to weeds by spreading half-rotted manure over the surface of the lawn during winter or early spring; or they accomplish the same thing by repeated reseeding with poor seed, either over the entire surface or in spots where mature weeds have been dug out. The only way to avoid re-infesting the lawn with weeds is to use such materials as leaf-mold, granulated peatmoss, commercial humus, compost, or mushroom soil as sources of humus, and to plant only the very highest quality of lawn grass seed.

THE MOST OBJECTIONABLE WEEDS

While there are a dozen or so weeds which may cause trouble, usually one lawn will have but three or four—quite enough, however, as every lawn owner knows!

Crab Grass. Both the most widely distributed and the most seriously troublesome of all lawn weeds is Crab Grass. This is also known as Finger Grass, Summer Grass, Water Grass, and Fall Grass. It is also called many other names—not to be printed!

Crab Grass is an annual, germinating usually with the advent of warm weather in May or June. Looking innocent enough at the start, it develops much more rapidly than any of the lawn grasses, soon sending out its typical spreading runners, which immediately root tenaciously wherever they come into contact with the soil. It is readily identified by these, by its broad coarse leaves, and by the spreading clusters of flower spikelets, somewhat resembling the claws of a crab, from which it gets its name.

While Crab Grass is an annual, it is so procumbent in growth that it cannot be entirely prevented from seeding, even by continuous close mowing. Going over the lawn with an iron rake and pulling the plants up where they can be reached with the mower, or with a grass sickle, helps in this respect. In a new lawn, the young plants should be dug out, *as soon as they can be distinguished*, before they have begun to root along the spreading branches; if not, they will cover patches or even large areas of the lawn, only to die with the first frosts and leave bare spots infested with a plentiful supply of seed for the following spring! Digging out the young plants is only a temporary measure of control. You may recall Antæus, the giant of ancient mythology, who could not be vanquished because his strength was renewed whenever he touched the earth; Hercules finally vanquished him by holding him aloft in the air. Similarly, the only way to get the best of Crab Grass is to keep it from coming in contact with the soil. Closely knit turf will choke most Crab Grass plants before they can get a start, and those which do will be prevented from spreading if the runners cannot come in contact with the soil. Every bare spot in a lawn, from whatever cause, should be immediately covered with compost and planted with *good* seed.

Dandelion. This is another universally distributed lawn weed. I must confess, personally, however, a certain admiration, perhaps sentimental, for its cheery, golden blossoms. They are at least engaging villains, and probably mean well! If very thick they may, like other broad-leaved weeds, be checked to a considerable extent by four or five applications, at intervals of a month or less, of iron sulphate—one pound to a gallon of water, which will be sufficient for about 250 square feet. The sprayer should be rinsed out immediately after use. The lawn grasses will be temporarily blackened by the spray, but not injured. Various trade preparations, such as Climax Lawn Sand, are used for the same purpose. The most certain way to get rid of them, however, is to dig them out *very* deeply; otherwise the remaining root will merely form several new crowns where the old one was removed. For digging out dandelions, and other deep-rooting perennial weeds such as plantain, buckhorn and dock, use an asparagus knife with a V-shaped blade, or better still a dandelion knife, or one of the other specially designed weeding tools now available.

Plantain and Buckhorn. Sometimes known as "broad-leaved plantain" and "narrow-leaved plantain." The former is more likely to appear in heavy damp soils and the latter on light poor soils. Both are much more easily dug out than dandelions, but the main roots should be cut well down. While this work can be done at any season of the year, it is well to go over the lawn twice, as early as possible in the spring, and again in late August or September, in each case sowing grass seed where the weeds have been removed. To get a lawn thoroughly cleared, it is well to mark off strips three or four feet wide, cleaning each thoroughly as there is time to do the work.

Yarrow. This has finely cut, not unattractive foliage of a pungent odor. It is not likely to appear in dangerous numbers and is easily disposed of.

Chick weed is likely to get a start in lawns where bare surfaces are left exposed. It forms a dense spreading mat, smothering out other growth as it spreads. Except in severe climates,

Lawn Weeds



Buckhorn or
Narrow-leaved Plantain



Bracted Plantain



Broad-leaved Plantain



Crab Grass



Dandelion

it will continue growth more or less throughout the winter, even producing its tiny white blossoms after the first falls of snow, and starting in again before anything else in the spring. It forms no tap root, and can be easily cut out, but all parts of the plant should be removed.

Dock. This is the coarsest growing weed and the most difficult of all to remove, but it is not likely to come in except where the lawn has been very badly neglected. Cut it six or eight inches below the soil, if the long whip-like roots cannot be pulled out entirely.

Wild Carrot. Is more likely to give trouble in pastures or meadows than on a lawn. These exquisitely designed white flower heads are known as "Queen's Anne's Lace" and are fully as beautiful as many perennials. Regular mowing will run it out, as it must reach a considerable height to develop.

Moss. While heavy liming is almost always recommended as a means of getting rid of moss, this is not a logical treatment, as the cause is poor drainage rather than an acid soil. Some lime, or better land plaster, should be used if the soil is extremely acid, but not to get rid of the moss, as this will grow in a poorly drained, alkaline soil. Loosening the soil to a depth of several inches, and applying sand or peatmoss, or both, will prove more beneficial than liming.

Grasses as Weeds. Bermuda grass, which is a lawn grass in the south, sometimes becomes a weed in northern lawns, dying out like crab grass, leaving brown, and later bare, spots. Orchard-grass, and timothy or herd's-grass, which are coarse growing and tend to form clumps, sometimes appear, and should be removed. They are introduced by the use of cheap mixtures for seeding or reseeding, and in barnyard manures.

INSECT AND ANIMAL PESTS

Except for weeds, the lawn is, fortunately, free from most troubles common to vegetables, flowers and ornamental plants. When one stops to think what troubles would result if we had a lavender-colored aphid to attack bluegrass, or a species of

white fly concealing its attack on the under sides of creeping bent, we have much to be thankful for!

Ants. These busy little creatures sometimes make a nuisance of themselves in the lawn, though the damage is often more apparent than real. In large numbers they may loosen up the soil, spoil the looks of an otherwise even surface, and help to take the edge off the lawn-mower blade. They are most likely to prove troublesome in light, sandy soils.

Carbon bisulphide is often recommended for use against ants. This is, however, extremely disagreeable in odor and highly explosive. Carbon tetrachloride is much more agreeable and safer. Either liquid produces, upon contact with the atmosphere, a heavier-than-air gas. It may be poured into the holes, or still better injected by means of a long-spouted oil can. The hill should be immediately covered with wet bags, or some receptacle such as a tin pail; a tablespoonful to each nest is usually sufficient. The treatment may be repeated after a few days if the ants are not all killed, or driven elsewhere, by the first application. An entirely new method for eradicating ants, which works on a different principle, and which has been endorsed by Government experiments, is to supply the ants with a mild poison which goes under the trade name of Antrol. This is carried by the workers to the queen ant, resulting in the destruction of the entire colony.

Earth Worms. These humble gardener's assistants, to whose prodigious efforts, during a few million years or so, much of the fertility of the earth's surface is due, fail to excite our admiration when their unwanted activities are continued in our carefully built lawns. Their zeal, like that of the prohibitionists, may be admirable, but they show a certain lack of discernment. They—the earth worms!—may be driven to the surface by an application of bichloride of mercury (corrosive sublimate) which is mixed with ordinary sand at the rate of one ounce to six pounds of sand, and scattered over the surface, after which it is copiously watered in. Allow about half an ounce of the chemical to each one hundred square feet. A heavy

sprinkling of tobacco dust or tobacco fertilizer, watered in, will have somewhat the same effect. Vermol is a powder made for the same purpose. Any of these materials are most effective when applied fairly early in the spring, but may be used at any season.

Asiatic and Japanese Beetle. The work of grubs, larvæ of the June beetle, Japanese beetle, and Asiatic beetle results in the dying of grass plants of which the roots have been eaten off. New lawns may be grub-proofed by mixing arsenate of lead in the top half-inch of soil before seed or stolons are sown. For each thousand square feet to be treated, thoroughly mix five pounds of powdered arsenate of lead with about the same bulk of moist (not wet) soil, and work in with a short-toothed rake. On established lawns, spread this poisoned top-dressing evenly when the grass is dry, and work into the turf with a rake or broom. If possible, apply before the first of June, but if grubs are present apply at once, regardless of season, provided the ground is not frozen or muddy.

Moles. In some sections and in some soils, these furry blind workers are a most provoking nuisance. They may be caught with traps, if one is patient enough and keeps at it, but carbon-bisulphide placed at intervals of a few feet along the runs, and covered in tightly with soil, will usually either kill or drive them away. Placing castor-oil beans in the runs will sound like a quack remedy, but I have seen it work, and do not think it was merely a coincidence. Old bags soaked in kerosene and placed in the runways, with all openings covered, will force them to make new tunnels where they may more easily be trapped, poisoned, or gassed. A remedy which I have never tried, but which sounds feasible, is that of attaching the end of a garden hose to the exhaust pipe of an automobile—the joint can be made fairly tight with electrician's tape—inserting the other end in the runway, and allowing the car to run for twenty minutes or so.

Where the moles have been at work the soil should be firmed

down again as soon as possible with a roller, sod tamper, or the back of a spade.

DISEASES

The one disease which is at all likely to appear, and then upon bent rather than upon bluegrass lawns, is known as Brown Patch. The name is descriptive of its character—circular, brown, dead-looking patches in the grass. Like most other fungous diseases it is favored by hot, muggy weather. It may be controlled by the use of No-Green (Semesan)—one-half pound to twenty-five gallons of water, applied at the rate of five quarts to each ten square feet. This should be followed by several applications of either spray or dry powder—two quarts of the former, or one-tenth of a pound of the latter, for each one hundred square feet, covering the area well around the infected spot.

CHAPTER IX

REPAIRING AND REMAKING OLD LAWNS

IF old, out-of-date and unsatisfactory lawns were replaced as punctiliously as automobiles in similar condition, the country's supply of grass seed would run out in a month!

Every community abounds in lawns which are no credit to the homes they were designed to, but no longer do, adorn: lawns which were started in high hopes that they would turn out to be dressed in that deep, green, smooth, velvety turf described on the seed packages, but long since abandoned in desperation to no more care than an occasional mowing and watering. For every new lawn to be made, there are a hundred old ones which should be remade or repaired!

TO REMAKE OR TO REPAIR?

The first problem to settle in connection with an old lawn which is unsatisfactory is whether to attempt to get it back into fairly good shape, or to take the bull by the horns and entirely remake it.

Let me say at the start that the remaking of an old lawn is not nearly so much of a task as the gardener is inclined to believe it will be. If the work is done in the fall, which is certainly the season when it should be done, there will be plenty of time for it, the place will not be "all torn up" for any considerable period, and the new lawn will be ready to greet the returning spring.

In very many cases the entire remaking of the whole lawn is the only way to get it back into fine condition. This is especially true if the trouble with it is not merely that it has

been neglected, but rather that it was not properly made in the first place. If the drainage is not adequate, the top soil is too shallow, or contains too little humus, or the surface soil is unsuitable in character for the production of a good turf—if, in a word, in spite of care and attention after planting, the present lawn has failed, no amount of patching, reseeding, and fertilizing is going to make it right.

But, on the other hand, the failure of the lawn may have been due to poor seed, or to neglect in caring for it. If there is present a fair amount of bluegrass or bent—even though the lawn may be badly infested with weeds—then the chances are that it can be brought back without going to the extreme of plowing or spading it up, and starting all over again.

REPAIRING

Tens of thousands of tons of grass seed are annually wasted in so-called “re-seeding,” which involves merely scattering new seed over the surface of the old lawn, with no preparation for it other than the possible application of some sheep manure and a dose of lime. Such an effort can have no possible effect other than a temporary titillation of that hope which springs eternal in the gardener’s breast! If repairing is to be done, it should be undertaken in a substantial, practical way.

If the work is to be started in early spring, and there is an accumulation of old dead grass, the first step is to get this out of the way, either by thorough raking or by burning. Burning over a lawn, under normal conditions, is not desirable; but in this case more may be gained than lost by it. Let the fire run *against* the wind, so it will do a thorough job. Such grass plants as there are will not be injured, if the burning is not done after a very long dry spell, when the crowns may be damaged.

Then rake as vigorously as possible. If some plants are torn up in this process, it will matter little. The object is to thoroughly loosen up the soil wherever it is exposed. A steel rake with sharp teeth should be employed; still better, a special lawn

cultivator rake, with heavy, sharp, recurved teeth which dig in and prepare the soil for reseeding as an ordinary rake cannot. Or an extra heavy iron rake, such as is used by contractors for mixing concrete, may be utilized. If the soil is very hard, the raking should be *preceded* by going over the surface with a flat tined spading fork, loosening it without actually digging the soil up, the holes made in the process being left open.

The next step is to top-dress the soil surface with compost (see page 38), one-quarter to three-quarters of an inch deep. If one does not wish to take the trouble to mix this compost, then use granulated peatmoss, commercial humus, or sifted leaf-mold alone. Fertilizers (see page 58) should be added with, or after, the top-dressing.

Follow this with a raking, and then with a thorough watering, to work the new soil and the fertilizers well into the surface.

After twelve to twenty-four hours for drying off, rake the surface over again lightly and sow the seed. If there is a fair amount of sod present, one pound of the mixture will answer for six to eight hundred square feet; otherwise the same amount as for seeding a new lawn will be none too much. After sowing, firm the soil by rolling, or by using a sod-tamper or the back of a spade, and water regularly until the plants are well started.

REMAKING

The method to be followed in completely remaking the lawn will depend upon its size, its condition, and whether or not any regrading is needed. If drainage is poor, then we face practically the same conditions met in making an entirely new lawn, and the directions in Chapter IV will apply.

If the lawn is large, a quarter to a half-acre or more, it is best to plow the old lawn as deeply as it is possible to go without turning up the subsoil. On a small area use a reversible or two-way plow which will lay the furrows all one way; they should not be turned over flat, but laid at an angle of about forty-five degrees. If manure can be obtained, spread

it on *after* plowing and work it into the soil with a disk harrow. If the layer of top soil is thin, additional soil may also be added to the surface, which should be brought approximately to the grade desired. Proceed then to prepare the surface soil for the seed bed as suggested in Chapter IV, page 36.

If the lawn area to be remade is not large enough to be plowed, it can be handled in one of two ways.

The first is to strip the entire surface of the old sod, cutting an inch to two inches deep; this is much quicker and easier than attempting to spade or fork the turf under, as is usually advised. But more important than the saving in labor is the fact that the sods thus removed may be kept and returned to the surface in the form of compost. If this is needed at once, the sod may be chopped up into moderately small pieces and run through a coarse screen, making it available for use in a compost for the surface layer. It is better, however, to utilize it in making a compost heap, so that it can decay before being returned to the lawn.

The second method, which involves less work, is to leave the sod where it is, chopping or cutting it up without turning it under. An effective and convenient way of doing this is to use a Planet Jr. garden cultivator, with a single cultivator tooth attached, or two teeth set three or four inches apart. By going over the lawn with this, working three to four inches deep, first in one direction and again at right angles, the sod will be cut and broken up into small pieces, and the soil thoroughly loosened and cultivated. On top of this surface, as it lies, may be applied fresh top soil, or, if this is not needed, a surface soil compost, one to three inches deep. (The old sod will eventually decay in the soil, forming the much needed moisture retaining humus.) The specially prepared and well-fertilized surface may then be seeded as already directed.

WHEN TO DO THE WORK

All that has been said about the advantage of seeding in the fall, rather than in the spring, applies just as forcibly to the

repairing or the remaking of old lawns as to the making of a new lawn.

The best way is to start the work in spring, or in early summer, with the intention of seeding in the fall. It is not necessary to leave the ground bare, with the consequent dust and unsightliness during the summer months. A seeding of one of the rye grasses—the annual Italian rye grass is good for this purpose—may be made after the preliminary work has been done in the spring, to provide a green surface during the summer. During this time the compost heap, which will be wanted for providing a new seed bed for sowing in the fall, may be made. In September or October, the rye grass may be lightly forked under or turned in with a hand plow, or merely clipped short with the lawn mower, the prepared surface soil applied over this, and the seed sown, as in making a new lawn.

CHAPTER X

LAWN TOOLS AND THEIR USES AND CARE

WHILE a good lawn, if it is a small one, may be cared for with very little special lawn equipment other than a lawn mower, a certain pleasure is derived from the accumulation of an adequate lawn outfit. Of course, the larger the lawn, the greater the saving in labor this special equipment will make. Almost anyone can acquire the special accessories wanted if one or two are added each season, and well cared for.

Lawn tools may be most conveniently discussed, perhaps, under headings designating the jobs they are intended to accomplish. Such general garden equipment as the wheelbarrow, spade, fork, shovel, spraying apparatus, and the like we need hardly mention here.

Raking. If but one rake is to be had it should be a first quality steel or iron garden rake; I much prefer the bow-head type to that with a straight shank; they are not nearly so likely to get bent or broken, and usually "hang" better. While a regular rake will answer all ordinary purposes, a special cultivator rake, to which reference has already been made (see page 75) tears out weeds and crab grass, and loosens up the soil as the garden rake cannot. A wooden rake is much better than either for raking up leaves or grass clippings. These, incidentally, should never be burned by any one who owns a lawn. If there are large trees near the lawn there is no way of preventing them from pilfering some of the plant food intended for the grass; however, they will return this with interest if the leaves are added to the compost heap, and distributed over the lawn the following spring. Special racks are

made for gathering leaves, but I have never found anything more convenient than large burlap bags.

Cutting. The selection of the lawn mower is most important. It is the poorest economy to get a cheap mower; they seldom go through the second season without getting out of order. A first quality mower should give ten years of service if it is well cared for. If the lawn is fairly level, invest in an eighteen- or twenty-inch mower; you will have to pay for it but once, and you will thank your stars every time you use it that it is not narrower. Where there is a great deal of hand trimming to be done, it will pay to have a trimmer in addition to the mower. This is a one-wheel lawn mower, cutting about six inches wide. It eliminates fifty to eighty per cent of the handwork.

For large grounds, the old-fashioned, heavy, clumsy, motor or tractor mowers have been largely replaced by the modern type, with a very light gasoline motor, mounted on a machine with a twenty- or twenty-four-inch cut. The operator walks, or may ride on a light sulky attachment. Such a machine will cut from two to six acres a day.

Shears. There will always be some hand work to do along the edges, around shrubs, flower borders, paths, and in the angles where a mower cannot operate. Grass shears of the "sheep shears" type, still largely used, are slow, tedious, and inefficient. Much of the work for which they are commonly used may be done more expeditiously with a grass hook or with a sickle. These should be supplemented by a pair of modern grass cutting shears, which have blades of high quality steel, and malleable iron handles shaped to fit the hand comfortably, and to protect the knuckles. Long-handled shears are of two types, one designed to cut vertically and the other horizontally; convenient, but not essential for the average-sized place.

Edging. For edging the lawn, the semi-circular edging knife (see page 50) should be used for the edges of flower beds, borders, and dirt or gravel pathways or drives. Along concrete walks, however, nothing is equal to the Planet Jr. edger with

a circular disk cutting wheel, which will do the job with incredible neatness and quickness.

Watering. No other part of the lawn equipment is so important as the watering outfit, and none so often inadequate.

An adjustable hose nozzle, with an adjustable support to hold the hose firmly in any position, makes a satisfactory watering outfit but requires frequent attention. Most circular sprinklers are open to two serious objections; they apply the water very unevenly, in annular rings, and they apply it so rapidly that it does not have time to soak into the soil before running and collecting on the surface. Both the slow-moving, long-armed circular type, and that which is adjustable for throwing a fine spray, are better. Still better, however, are the irrigators equipped with regular irrigation nozzles. These are more expensive, but cover larger areas and do a much better job of watering. The higher quality automatically revolved irrigators which cover from one position an area approximately fifty feet *square* (not round) cost about forty dollars, but are worth it on a place of any size, taking care not only of the lawn but of the vegetables, flowers, shrubs, and all watering to be done. They have no gears nor rapidly revolving parts to quickly wear out.

For large lawns, on fine places, a permanent irrigating equipment, either overhead or underground, is by far the most satisfactory of all. They cost quite a bit to put in, but the saving in labor each season will return a very high rate of interest on the original investment, and the watering is done much more perfectly than it can be in any other way.

Weeding. An ordinary asparagus knife, with a fishtail or Y-shaped cutting edge, costing seventy-five cents, will cut out roots much deeper down and with half the effort needed with the ordinary kitchen or pocket knife. A modification of the asparagus knife has been made in what is called a "dandelion knife," a change in the handle making it somewhat more convenient to use for weeding. Some more modern weed extractors have long handles and are designed both to cut the weeds

below the surface and to grasp and tear them out, as the handle is pulled back. The "Out-u-come" and Cleveland weeders are of this type.

Firming the Turf. Two types of hand rollers are used in preparing the lawn for planting and caring for it afterward. The first has heavy iron rollers, made in sections to allow for easier turning; the second, and more convenient to use, has a tight drum which may be filled with sand or water to increase the weight. The latter type is preferable, one advantage being the rounded edges of the roller, which are less likely to leave ridges, or dig into the soil where one does not want them to.

If no roller is available, a sod tamper with an iron head about a foot square may be purchased for from three to four dollars; or one slightly larger with a heavy wooden head may be home-made, using a piece of two-inch plank and an old broom or hoe handle.

Distributing Seeds and Fertilizers. Where a considerable area is to be seeded, it will pay to invest in a hand seeder such as the Calhoun, or still better, in a wheelbarrow seeder.

For the even and rapid distribution of fertilizer, the Planet Jr. fertilizer distributor will make a return on the investment both on the labor and materials saved besides doing the work better than it is generally possible to get it done by hand.

Care. The lawn tools should be accorded a special place by themselves in the tool house or cellar, and always be cleaned and wiped off with a rag soaked with kerosene or heavy oil, immediately after using. Like any tools which are not used continuously, they are destroyed not so much by wear as by rust.

CHAPTER XI

LAWNS FOR SPECIAL CONDITIONS GRASS SEED FORMULÆ AND FERTILIZERS

THE chief variations in lawn-making in different sections of the country are in varieties of grasses used and time of planting. The problems of plant food, humus, and preparation of the soil are much the same everywhere.

LAWNS FOR THE SOUTH

Except in the more northern of the Southern states, Kentucky bluegrass cannot be used successfully unless local conditions, such as may be found at high elevations, approximate the climate further North. As no grass is yet available which will remain green throughout the entire year in Southern sections, a double lawn system is generally followed.

The method is to plant Bermuda grass from March first to June first. This is a warm weather grass, and the seed will not germinate while the ground is cold. It makes a deep-rooting growth, with a spreading underground root system, and is therefore good for slopes or banks, but it will not stand much shade. Bermuda grass may be grown from seed; or by the "vegetative method," already described for the planting of bent grasses (see page 51).

In September the Bermuda grass begins to turn brown. This indicates the time for remaking the lawn for the winter. The grass should be cut closely, all weeds cut or raked off, and the surface raked over to prepare a seed bed for the winter lawn. For this purpose, either Italian or one of the other rye grasses is used, by itself, or in combination with white clover, in proportions of three to two, or three to one. The clover

is especially desirable in shady places. Pacey's rye grass does not make such a beautiful turf in the South, but lives for several seasons. A method now followed by many gardeners is to sow Bermuda in the spring, and Pacey's rye grass and clover in the fall, thus securing a lawn which, with proper care and an occasional reseeding where the turf becomes thin, will remain in good condition for four or five years.

A general purpose mixture for use except in the extreme South, designed to give a lawn that will be green the year round, for fall sowing or on Bermuda grass sod, is:

Kentucky bluegrass	50 per cent
Redtop	15 per cent
Creeping (mixed) bent	10 per cent
Meadow fescue	10 per cent
Italian rye grass	10 per cent
Pacey's rye grass	5 per cent
(Add 3 to 5% clover, if desired)	

In the extreme southern sections, inland from the Gulf, and up the coast to the Carolinas, carpet grass does better than Bermuda on sandy, and especially on moist, soils. St. Augustine grass is similar in some respects to carpet grass, but somewhat coarser. It is also less procumbent in habit.

To keep a lawn green during the summer in the South, an adequate watering system is essential. Too often this point is neglected.

LAWN GRASS FORMULÆ

The following mixtures are recommended for lawns of various types, and for various conditions:

FOR A BLUEGRASS LAWN *(rebalancing sod)*

Kentucky bluegrass.....	60 per cent
English rye grass	15 per cent
Redtop	25 per cent
(Add 2 or 3% clover, if desired)	

FOR A BENT LAWN *(shading and soil)*

Rhode Island (Colonial) bent	35 per cent
Creeping (Mixed) bent	35 per cent
Redtop	10 per cent
Chewing's fescue	20 per cent

COMBINATION

(*neutral*)

Kentucky bluegrass.....	35 per cent
Mixed bent	35 per cent
Redtop	20 per cent
Chewing's fescue	10 per cent

SHADE

Rough-stalked meadowgrass (<i>Poa trivialis</i>)	50 per cent
Kentucky bluegrass	25 per cent
Redtop	10 per cent
Chewing's fescue	10 per cent
Fine-leaved fescue	5 per cent

SEASHORE

Rhode Island bent	30 per cent
Red (Creeping) fescue	20 per cent
Kentucky bluegrass.....	25 per cent
Pacey's rye grass	10 per cent
Redtop	10 per cent
White clover	5 per cent

TERRACE

Kentucky bluegrass.....	35 per cent
Creeping bent	30 per cent
Red (Creeping) fescue	20 per cent
Italian rye grass	10 per cent
White clover	5 per cent
(If on dry, sandy soil add 5 to 10% sheep's fescue)	

FERTILIZERS

A "complete" fertilizer is one which contains all three essential plant foods—nitrogen, phosphoric acid, and potash. A good general formula for preparation of the soil for lawn purposes is 6 per cent of nitrogen, 8 per cent of phosphoric acid, and 4 per cent of potash—to be applied at the rate of two to four pounds for each one hundred square feet, though less will answer if manure has been used.

One may either buy a ready-made mixture, or purchase the materials separately and mix them together before applying them to the lawn. An application of bone meal and the other materials suggested in Chapter IV will, however, give just as good results as a mixture.

Among fertilizer materials and humus supplying materials

convenient and effective for lawn use are the following. The figures given in parenthesis at the ends of the descriptions indicate how many pounds to apply, under average conditions, to one hundred square feet.

NITROGENOUS FERTILIZERS

These are valuable solely or chiefly for the nitrogen contained.

Ammonium sulphate (Sulphate of Ammonia). An inorganic fertilizer containing about 30 per cent of nitrogen, stimulating grass growth and discouraging weed growth by keeping the soil neutral or making it slightly acid in reaction; may burn the plants and is safer applied mixed with several times its bulk of sand or soil or peatmoss. ($\frac{1}{4}$ to $\frac{1}{2}$ pound.)

Blood, Dried. Organic fertilizer. Also a stimulant that contains some phosphoric acid as well as nitrogen; alkaline in reaction. (1 to 2 pounds.)

Blood and bone, or Tankage. Organic, similar to dried blood, but contains more phosphoric acid and less nitrogen. (1 to 3 pounds.)

Cottonseed Meal. An organic fertilizer, rich in nitrogen and containing some potash. One of the best of all lawn fertilizers. Safe to use in any quantity. Good both in the preparation of the soil and for top-dressing afterward. (2 to 5 pounds.)

Soy-bean Meal. Similar to the above, and equally effective and desirable.

Floranid (Urea). Inorganic fertilizer in which the nitrogen is obtained from the air. Very powerful, containing forty-six per cent of available nitrogen and best applied when mixed with something else as recommended for ammonium sulphate. ($\frac{1}{4}$ to $\frac{1}{2}$ pounds.)

Nitrate of Soda. Inorganic fertilizer containing about fifteen per cent of available nitrogen. Should be watered in immediately after applying, or mixed with sand, soil or peatmoss. Alkaline in reaction; better for bluegrass and clover lawns than for other types. ($\frac{1}{2}$ to 2 pounds.)

CONTAINING PHOSPHORIC ACID

Superphosphate (acid phosphate). An inorganic fertilizer containing about sixteen per cent of phosphoric acid and some lime. A good fertilizer to use in the preparation of decidedly acid soils before planting; best avoided as a top-dressing, being alkaline in its effect on the soil. (2 to 5 pounds.)

Bone Meal. Organic. Contains both nitrogen and phosphoric acid, but more of the latter. The small amount of lime contained is not objectionable under most conditions. One of the very best fertilizers for both preparation of the soil and as a top-dressing subsequently. There are three grades available: bone flour, the quickest acting; bone meal; and coarse ground, inch, or button bone, both of which will continue to feed the soil for several seasons. (2 to 4 pounds.)

POTASH FERTILIZERS

Wood ashes. May either be obtained locally or purchased from fertilizer supply companies; are safe to use and long lasting. They greatly stimulate the growth of clover. They contain some lime but not enough to be objectionable on acid or neutral soils. (4 to 8 pounds.)

Tobacco Fertilizers. Another organic fertilizer, made from refuse tobacco. Contains some nitrogen and phosphoric acid in addition to potash; also acts as a disinfectant and insect repellent. Excellent both in the preparation of the soil for planting and as a top-dressing, one of the most satisfactory in every way. (3 to 6 pounds.)

Potash Salts. Muriate of potash, containing about twenty-two per cent of potash; and sulphate of potash, containing nearly fifty per cent, are used in many mixed fertilizers as a source of potash; not so desirable for lawn purposes as the few materials mentioned above. (2 to 5 pounds.)

MISCELLANEOUS

Lime. Hydrated agricultural lime is used to sweeten acid

soils; it also improves the mechanical condition of the soil and liberates the plant foods in the soil. Pulverized limestone acts more slowly, but with the same results. Both are best omitted entirely from the lawn program, except in the original preparation of decidedly acid soils. (4 to 8 pounds.)

Gypsum (Land Plaster). Better for lawn use than either hydrated lime or limestone, as it furnishes the lime which may be needed for the plant growth without creating an alkaline condition of the soil; excellent both for binding light, sandy soils and for making heavy clay soils more friable. (6 to 8 pounds.)

Adco. A bacterial culture, which, when added to the compost heap, or leaves or garden refuse, greatly accelerates decay; excellent to make artificial manure where it is difficult to get barnyard manure.

Peatmoss. The most important of all humus-forming materials. Clean, sanitary, and free from weed seeds, it keeps indefinitely either under cover or in the open.

Humus. A black, light vegetable soil which, like peatmoss, has great water-holding capacity and is extremely congenial to the development of grass roots.

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